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FEBRUARY

What Is It?
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VOLUME 48 NUMBER 4

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ON THE COVER:

This weird beastie, shot in 35-mm Kodachrome, by Paul A. Zahl, is a small wolf spider, genus Pardosa, very common in this country. The white, tusk-like object is an ordinary pin, magnified many times, on which this specimen was impaled for the photo. (He is dead, poor chap.)

editor

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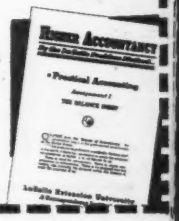

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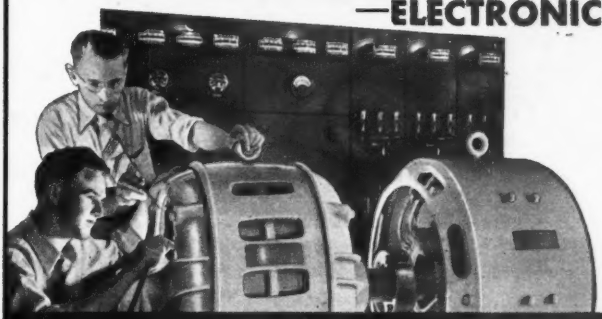

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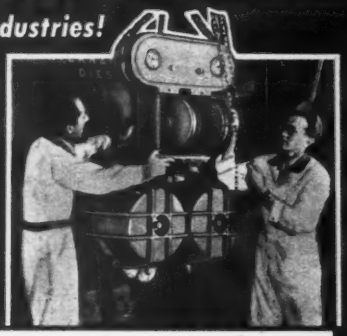

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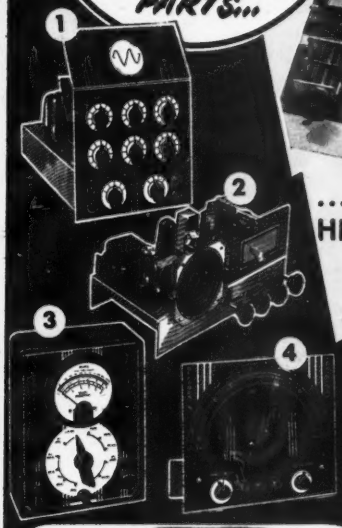

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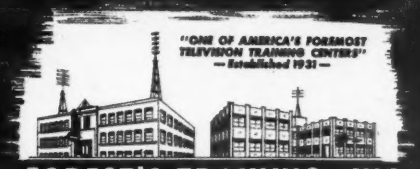

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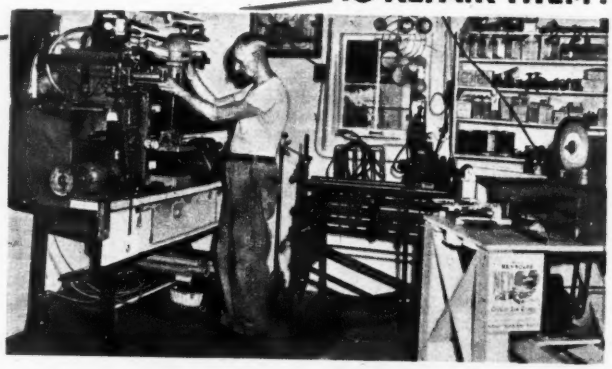

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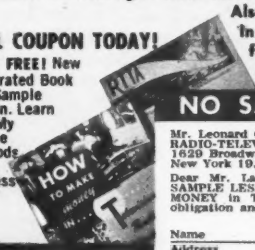

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The Editor's Workbench

"Ebenezer the Great runs like a Jaguar after a soothing serenade of Old Black Joe," says driver Joe (Tubby) Dunstan who explains he sold the whitewall tires to get his melodious banjo out of hock.

"Gee, it's good to be on solid ground again!" says Hot Rod Joe after driving Ebenezer at 60 per.

"This little piggy went to market," quips Joe, inspecting the oil drain plug in Eb's gizzard.

"Well, you gotta have a little trouble with all of them," Joe moans as he does you-know-what.

Tubby Tests "Ebenezer the Great"

NOTE: A couple of Chase, Maryland, lads named Joe (Tubby) Dunstan and Ralph (Timber) Love, got to spoofing around with a McCahill-type test of their 1931 Chevy, Ebenezer the Great, and came up with the following. We think it's kinda funny. Agree?—**Bill Parker.**

WHILE other fellows my age have their hearts set on one of those new, super-colossal Detroit wonder buggies that from the rear resemble something more like a V-2 rocket than an automobile, I have had my eyes trained on a true classic car. This car is (hold your breath) the 1931 Chevrolet and although (exhale) its year sounds of depression, corner apple stands and Herbert Hoover, there is still a lot of oomph in the old girl yet.

The car I tested was not a pampered, garage-kept baby but a real rugged buggy that has gone through more turmoil than a G.I. on permanent K.P. It has gone through everything from corduroy roads and washouts in Alabama and Georgia to new super highways here in Maryland. The car has carried everything from bathtubs to milk goats and, occasionally, humans.

It has been beaten, smashed, pushed and trampled but no mortal has been able to dampen the spirit of this solid citizen of the royal order of Detroit carbon monoxide petrol-pushers. This is the same horseless carriage that made Ford play second fiddle in sales production. The compression is not too high (about 5 to 1) which has its advantages. A bucket of kerosene or a shot of lighter fluid will get you there provided you are one of those persons who sometimes forgets that these jobs don't run on the hot air from [*Continued on page* 41]

And here's the old boy himself, glamorous as all get-out in the whitewalls he had for a while.

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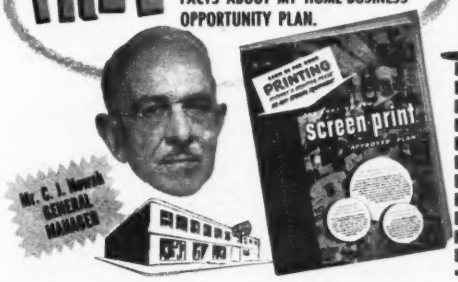

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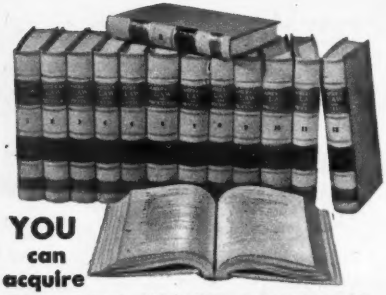

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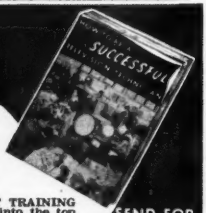

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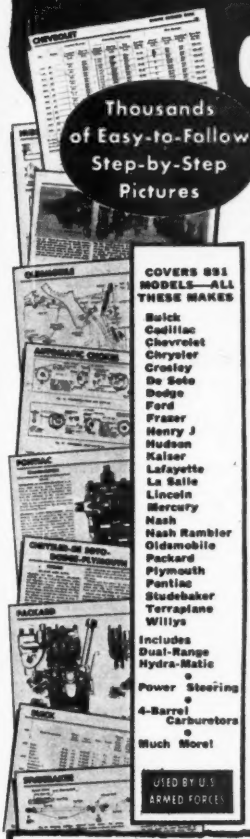

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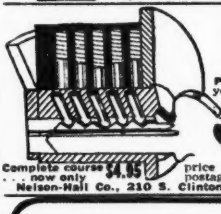

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Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

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CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

33-B DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

Invention Clinic

JOSEPH H. KRAUS

Paint Removers

PAINT removing is one field toward which the inventor can apply himself without too much fear that "everything has been patented." He can become speedily successful if he will provide the right answer. At the U. S. Patent Office only a handful of patents is given over to chemical paint removal methods, while the electrical and mechanical methods add just a few more to the coverage.

Nearly everyone has seen a painter apply a gasoline torch to wooden trim, then follow the flame quickly with the paint scraper. On wide, flat work this method is reasonably fast and quite good. Occasionally it leaves a burned or blackened spot which requires added treatment. But on moldings, against glass or in sharp corners, the torch method leaves much to be desired. Furthermore, it is likely to prove rather dangerous for the inexperienced person to use indoors.

Chemical solvents also have become popular. The fact that there are many liquids and pastes on the market is no deterrent to the sale and development of a better product. Even if the new substance did merely what the literature claims for some of the marketed products it would meet with success. The writer has used removers which state that the product will cut the paint right down to the wood, but all painted surfaces do not react as claims say they should. A painted army bed, for example, could not be stripped of its surface upon application of every chemical remover available, nor even upon use of a torch.

Among the records of the Patent Office one will find what may be characterized as "shot-gun" formulas for paint remover compositions. Some of the ingredients in the compositions serve no purpose whatever. The remover would work just as well, or as poorly, if half of the contents were eliminated. The additives are included merely for the purpose of disguise. This adds to the costs of production yet never stumps the chemist who decides to analyze the composition. Besides, for 25 cents, anyone can get a copy of the patent and know what the mixture contains.

Many new kinds of paint are appearing on the market. Manufacturers continually attempt to improve the bond between wood and protective surfacing. Fire retarding substances are added to some of the newer paints. Synthetic resins, which change their molecular structure to become non-soluble products, are replacing natural resins. Water-soluble rubber-like compositions are relatively new paint inclusions. All these things add to the increasing difficulty of producing a satisfactory paint removing chemical or system.

Any inventor or chemist can go to work on the project. There is plenty of test material available from the auto junk yard, dumps or buildings being wrecked or repaired. Test strips of wood also can be prepared by applying paint obtained from small cans, which are inexpensive. It is important to get as variable a treatment of surfaces as is possible. Also part of the surface should have a deep-cut molding into which added paint thickness will pour and against the sides of which the paint may hold more tenaciously. One coat of paint only should be applied to some of the test samples. Others should have many coats, even one type of paint applied on top of another, with repetitions scrambling the order. You may, for example, apply paints A, B and C, in that order, and find that your proposed remover is fine, yet the surface may not strip off at all if you used the same paints in the order of B, C, A, or B, A, C. It is type, not color, which must come under investigation, as well as pre-surface treatment. Include paints demanding special solvents as well as those thinned with water, alcohol, turpentine, benzene, acetone and the like. Copious notes should be kept not only of the way the wood strips were painted, but also

[*Continued on page* 24]

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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INVENTORS

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INVENTORS

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GUSTAVE MILLER
23MI Warner Building
Washington 4, D.C.

REGISTERED PATENT ATTORNEY
Patent Attorney & Advisor U.S. NAVY DEPT. 1938-1947
ASSOCIATE EXAMINER U. S. PAT. OFF. 1922-1929
PATENT LAWYER

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INVENTORS

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NEW YORK CITY

Invention Clinic

[*Continued from page* 22]

of the age of the pieces and the results obtained with the removers. Make sure to give fresh paint plenty of time to dry, weather or modify.

To give you some idea of the patent situation in the chemical paint remover field, the following items have been selected as somewhat representative. Excluded are the flame and heater types of removers.

Removing enamel from metal objects by dipping into molten caustic soda or potash was patented in 1894 by George W. Goetz, Milwaukee, Wis. (It would not do to try this system on aluminum or other metals which are damaged by caustic alkalis—Ed.)

Ammonia vapor and steam under a pressure of 7 to 8 pounds per square inch, directed from a hose nozzle against the work, was the method patented in 1898 by two Brooklyn inventors. Strong ammonia (28 per cent) was specified. This was to be added to a large quantity of water.

A two-solution paint remover was patented in 1901 by Charles P. Staley of Indianapolis, Ind. Solution A was made by dissolving 5 oz. of caustic potash in 3 qts. of water, then adding to this a mixture of 3 oz. of cornmeal, ½ oz. of French yellow ochre in one qt. water. Solution B consisted of 4 oz. of oxalic acid and ½ oz. of dry Venetian red pigment in 1 gal. of water. Solution A was to be applied, then followed by the neutralizer Solution B.

Paraffin as an evaporation retarding agent, soapy, waxy or fatty substances, or the use of inert material such as wood flour, grain flour, starch, magnesia, Fuller's earth and the like, are recommended in a number of inventions employing a volatile liquid. Such substances also tend to hold liquids against vertical or overhead surfaces. One formula, patented in 1908, calls for 45 pounds of paraffin, dissolved in 135 gallons of benzol

[*Continued on page* 45]

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS
Registered Patent Attorney
923 Columbian Building, Washington 1, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
209 Columbian Building Washington 1, D. C.

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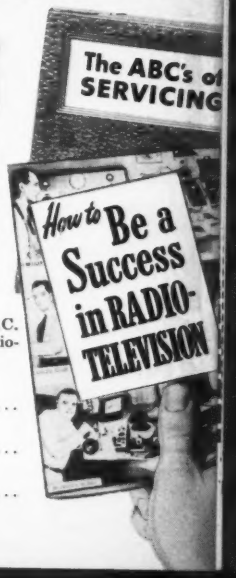

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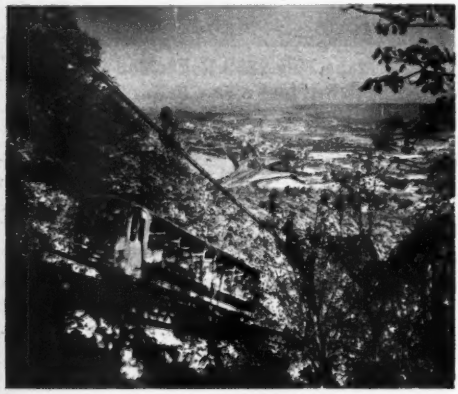
Chattanooga Steep Choo-Choo

We enjoyed reading your article World's Steepest Railway in the October 1952 issue of MECHANIX ILLUSTRATED (page 62). While we have always known the Johnstown Incline



was a close rival, you were in error in describing it as the steepest—the famed Lookout Mountain Incline in Chattanooga is the steepest.

We are enclosing a photograph of it.

J. T. Halladay
Executive Director
Chattanoogans, Inc.
Chattanooga, Tenn.

Join the PSCTSCC?

In your lead story in December issue (Santa Clauses, Salami-Tyers and Soap-Tasters, page 53), you mention the strict training that many Santa Clauses go through to prepare for their jobs. It sounds sort of tragic to me that these poor old men have to spend so much time preparing for such a short job. And probably at such low wages.

I feel so sorry for these men that I'd like to start an organization to care for them in their off season. I'm calling it the Play Santa Claus to Santa Claus Club.

Mrs. L. K. Laminole
Los Angeles, Calif.

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FarmOroad No More

What ever happened to the Crosley Farm-Oroad? You did a story on it in 1950 and success seemed to be assured for it. What happened?

Larry McKinley
Grimes, Iowa

What ever happened to Crosley for that matter? We regret to inform you that the Crosley company passed away last June FarmOroad and all.

Practical Inventor

In answer to Mr. McCormick's plea for a portable hole-in-the-ground in your May Dear Editor column, I have already developed such a hole.

Now I'm working on something new—cactus with stickers on the inside. For people with tender fingers.

Anyone interested in backing me?

Sam Hanson
Covina, Calif.

No.

Real Tucker Story

Glancing over some of my old copies of MI, I came across an account of the Tucker car. In view of the statement that 200 cars were on the assembly line, I'm writing to ask if any of these wonder cars are still around today. And were you fooled like the rest of us?

John Riches
Alameda, Calif.

As a matter of fact, there are still some Tuckers floating around and they seem to be in running condition. But, as to whether we were fooled, frankly we don't know for sure. But, if the Tucker story still intrigues you, we think you'll find the first issue of CARS interesting. In this new auto magazine, prepared by the editors of MI, Preston Tucker tells his side of the story of what really happened to the Tucker Torpedo. It's on your newsstand now.

[Continued on page 37]

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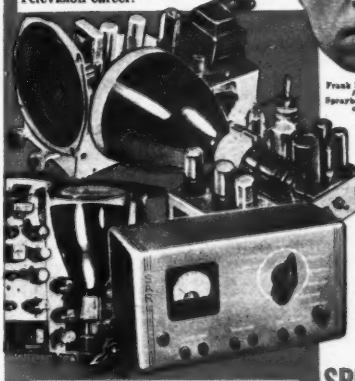

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FREE 10 DAY TRIAL

WHAT A BUY! Surplus stock from a big midwest supply firm makes these gigantic savings available to you! Sturdy, serviceable work clothes, though used, have been washed, thoroughly sterilized and reconditioned. Every garment made of long-wearing wash materials, strongly sewn, with reinforced stitching at points of strain. When ordering please state measurements under item.

SEND NO MONEY! Just send name, complete address, clothing desired (state how many of each), and your color choice (also 2nd color choice). We will ship immediately. Pay postman plus postage when your order arrives. Or, enclose cash, check or money order, and We Pay Postage. Keep 10 days. Return for full refund of purchase price if not completely satisfied. Order TODAY at our risk!

YOUNG DISTRIBUTING CO. Dept. 1029 2605 Elmhurst, Detroit 6, Mich.

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Sent to Acquaint You with the Exceptional Values of Our Special Offers

Get these valuable exciting stamps from the far corners of the British Empire: Pitcairn Islands (settled by mutineers), Falkland Islands (only post-office in Antarctic Circle), Tanganyika (land of pygmies and head-hunters), Ceylon, South Africa, many others! Price in Standard Stamp Catalog at least $2.00! Supply limited — so rush coupon today enclosing 10c to help pay postage and handling charges. (We'll also include other exceptional values for your inspection.)

Also FREE— our valuable illustrated booklet "How to Recognize Rare Stamps". Tells where and how to hunt for rare stamps, how to identify and sell them. May guide you to stamps worth hundreds of dollars!

KENMORE STAMP CO., Dept. MI-2
Milford, New Hampshire
Rush me FREE 100 British Empire Stamps and Booklet "How to Recognize Rare Stamps."
I enclose 10c to help pay postage and handling.

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—and re-cast junk batteries into new, with and without new materials; the latest achievement. We supply complete instructions and everything needed. Large daily profits.

BATTERY LABORATORY SCHOOL
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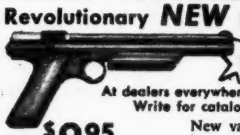

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I WASTED MONEY BECAUSE A GAUGE WAS MISSING

by JOSEPH CATANZANO

That's a fact . . . I'd been tossing dollar bills out of the window of my car because a gauge was missing from my dashboard. I didn't realize *how much* I'd been wasting until I installed the Mile-O-Meter my wife gave me for my last birthday. That's the day I began to save . . . I've got four new tires now to prove it.

MOUNTED MILE-O-METER ON MY DASH

The instructions that came with the Mile-O-Meter seemed complete enough, but I didn't realize *how* complete until I lifted the hood of the car and began to follow directions. I actually finished the entire installation without doing anything really complicated! I mounted the Mile-O-Meter itself at the corner of the dashboard on the driver's side, using one of the screws on the windshield flange to hold the bracket. I didn't have to drill a single hole.

GAS SAVINGS ARE MOUNTING

I got my first shock when I took the car out for a trial spin that day. The Mile-O-Meter indicator practically shouted at me that I was pouring gas out of the tail pipe! I tried it again, this time keeping a light foot on the accelerator. The difference in gas consumption, shown clearly on the relative miles-per-gallon scale, almost floored me . . . I was traveling practically as fast, with just about as much power, yet I was using far less gasoline than before! Now all I have to do is drive so the Mile-O-Meter indicator points as far to the right as possible. When I do that, I know I'm getting my best mileage . . . and the gas savings are really mounting up to prove it.

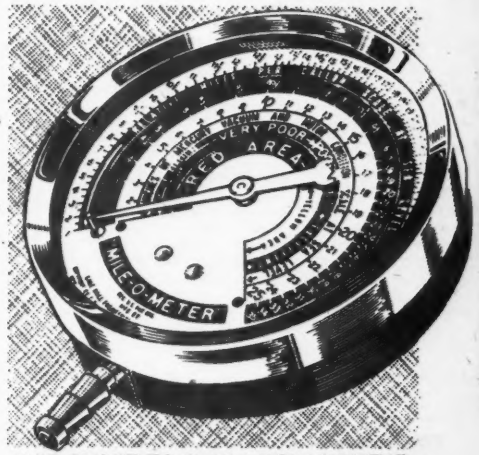
AVOIDED COSTLY REPAIRS, TOO

About three months ago, I noticed that the indicator on the gauge flickered downward every second or two. I didn't *hear* anything wrong with the engine, but according to the tune-up chart supplied with the Mile-O-Meter, I had a spark plug that wasn't firing properly. By following directions, I found which plug was fouled, replaced it . . . and saved myself expensive trouble later on. Another time, the Mile-O-Meter indicated that my carburetor needed adjustment — and, with the tune-up chart, enabled me to adjust it myself! The way the Mile-O-Meter works sounds a bit complicated, but as I understand it, the gauge is kind of like a doctor with his finger on your pulse all the time . . . it gives a continuous report on the general "health" of your engine. It does this by measuring the vacuum in the intake manifold, just as a mechanic does when he's tuning up your car. As a result, I know when adjustments are needed to avoid those wallet-busting repairs.

(Joseph Catanzano, 75 Mary St., Arlington, Mass., is typical of thousands of enthusiastic Mile-O-Meter owners. We thought his experiences with the instrument would interest you.)

I'M REALLY SAVING MONEY!

It's the truth . . . I'm really saving money. I'm getting three or four more miles to every gallon. I *see* (instead of *hear!*) when my engine needs attention. And, I've been able to make many of the minor repairs and tune-ups myself, because the Mile-O-Meter and its chart showed me how.



YOU OUGHT TO OWN A MILE-O-METER

I admit it . . . I'm sold completely on the Mile-O-Meter. If you don't have one on your dashboard, the chances are you're still wasting just as much money as I did. You've got everything to gain by installing a Mile-O-Meter . . . and nothing to lose, because they're always sold on a "money back if not completely satisfied" basis. You ought to send your order in right away.

$14.95

- Deluxe illuminated.
- 3⅝" diameter.
- Chrome trim.

$9.75

- Standard Model.
- 2⅝" diameter.
- Plated trim.

ORDER NOW

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☐ Check Enclosed ☐ Money Order Enclosed ☐ Send C.O.D.

Orders are shipped within 24 hours anywhere in the U. S. A. We pay postage when payment accompanies order. Add 35c for special delivery, if desired. Each Mile-O-Meter is gift-packaged, with all accessories and instructions included.

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FOR REPAIRING ALL ELECTRICAL APPLIANCES-MOTORS

an all-around electrical trouble shooter

- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, etc.
- Will measure the current consumption while the appliance under test is in operation. The appliance or utility may be plugged directly into the front panel receptacle. A special pair of insulated clip-end leads is included for motors, etc.
- Incorporates a sensitive direct-reading resistance range which will accurately measure all resistances commonly used in electrical appliances, motors, etc. This range will enable continuity checks and tests for shorts and opens.
- Will test thermostats, radio tube filaments, bulbs, fuses, fluorescents, condensers, switches, field coils, circuit breakers, lighting systems, etc.

Handsome round cornered molded bakelite case 3½" x 5⅞" x 2¼". Complete with all test leads and instructions.

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ABOUT ½ MILLION NOW IN USE. Most users who write us swear by them and some report up to 25% more mileage. Many comment on Smoother Motor, Easier Starting, Faster Pick-Up, Better Idling. But some swear at them with "No Improvement" and fire "the little stinkers" back—proving Ganes can and do sometimes fail completely. So we invite you to try "the little stinkers" at "no cost," to see what they will do for you. Make NO deposit. Send NO money. Pay postman NOTHING. TRY BEFORE YOU BUY—10 DAY FREE TRIAL OFFER. You, or your service station, can quickly install them.

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A NEW INDUSTRY . . . A NEW MIRACLE FINISH!!
MAKE $500 to $1000 PER HOUR and more!

Flok-Kraft Covers:
Fabric, Metal, Glass, Plaster, Wood, Plastic or—*any surface!*

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"Received the flok-kraft outfit and everyone that saw it is very enthused. I only had it about thirty minutes and got an order for a hundred dollar job." Mr. C. H. Maryland.

"Got $52.50 for these 7 trunk interiors for about 4 hours work. $7.50 per trunk." J. O., Mo.

". . . I have received my order of Flok and Adhesives and believe me, I'm very pleased and happy as I've made myself MORE than the cost of my supplies already, and I've still got more jobs to do." Cpl. G. W., S. Carolina

". . . pleased with your course and I'm being swamped with work to do." W. F.,

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At last the carefully guarded secrets of this amazing miracle finish can be yours. Huge profits are waiting to be tapped in this tremendous new field. Flok-Kraft gives a velvety, luxurious surface to radios, lamps, toys, signs, store displays, figurines, auto dash boards—actually a thousand and one items to be seen on every hand can easily and quickly be beautified, enriched, increased in value with Flok-Kraft. Make old objects beautiful and saleable. Make new things worth more with this soft, rich covering that can be applied to any surface, even if old and worn.

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Yes, you can learn in a few days to start making money—big money! Make to $5.00—yes! even $10.00 *and more* per hour. Everything you need is furnished, including fully detailed instructions that are *complete* and easy to understand. Every point is explained to show you how to start on the road to big money, full or spare time.

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This is one too good to miss. Fill out the coupon below and mail it today for full free details. I'll arrange to send you the complete outfit—everything you need to start—for leisurely, no-risk examination right in your own home. You owe it to yourself to investigate. Write now for full, free details, samples, etc. Fill out and mail the coupon below. Do it today! Everything I send you is FREE.

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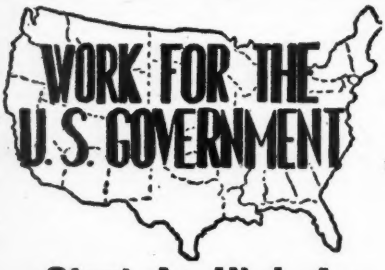

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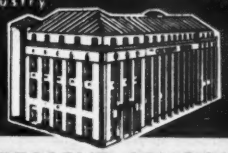

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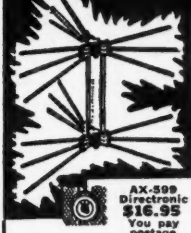

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Dear Editor—

[*Continued from page 26*]

Skylark Protest

Would you mind telling me where the Buick people get the nerve to pass off their Skylark as a sports car? Of all the hoaxes . . . taking a Buick Roadmaster Convertible, dressing it up a bit and trying to palm it off as a sports car is a gross insult to the intelligence of any automotive-minded person!

Donald R. Hole
Reading, Pa.

Pin-up Workshop?

How about a Workshop of the Month contest? I'd like to see some pictures of workshops or workbenches where some of those masterpieces of Workbench Awards are turned out. It could be featured like Pin-up Car.

Kenneth L. Orris
Maumee, Ohio

How about that?

Canada Loves Tom

Here, we consider McCahill America's most trustworthy authority in judging stock cars. No matter what falsies or clever gadgets on a car, he will call it a lemon if it is just that underneath.

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Quebec City, Canada

Post-Office Chess

I would like to play chess with someone by mail. Put your move on a post card and I'll play with the first card I receive.

Spencer Hall
Box 276
Christiansburg, Va.

Canadian Thanks

This week I returned from a vacation in New York and I would like to express my appreciation of the very fine roads in that state and the friendly people I met on them. This applies also to the service stations and especially to the garage in Elmira which carried out a complete oil change for me even though my little British car wouldn't go over the pit.

G. W. Hunt
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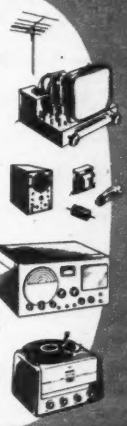

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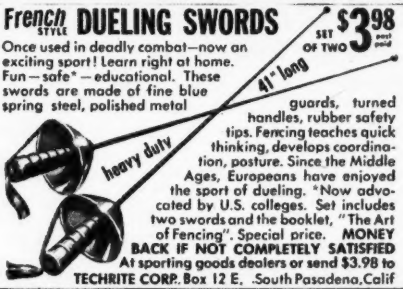

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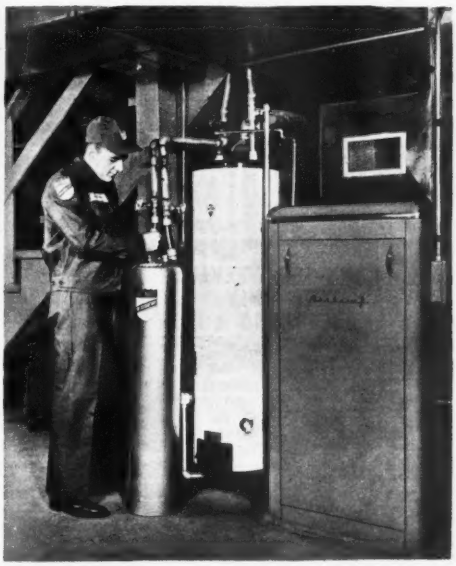

Unit occupying less than a foot of floor space contains a man-made mineral, zeolite, which counteracts hardness in water. Every two or four weeks service man replaces exhausted softener in unit. There is no interruption in flow. Harshe-Rotman, Chicago 3, Ill.

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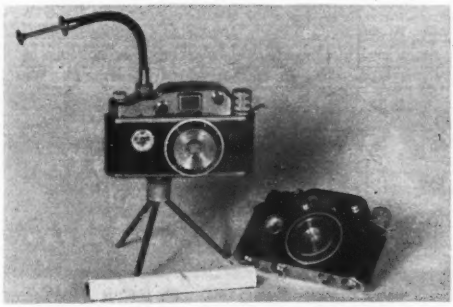

Combination table and pocket lighter looks like a miniature camera. Tripod and cable release—are easily detached. The 2¼" long lighter is made of black Bakelite with simulated leather finish. Oriental Sales, P.O. Box 4084, Valley Village Sta., North Hollywood.

[Continued on page 48]

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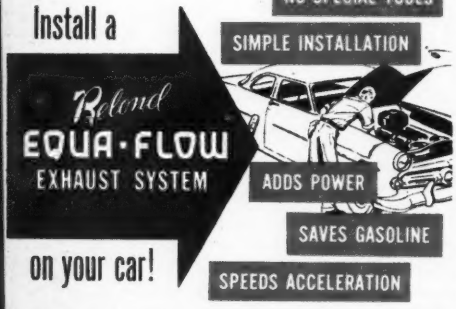

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The Editor's Workbench

[*Continued from page* 16]

your mother-in-law in the back seat. (Of course, not being married, I wouldn't know.) Now let's get down to brass tacks and my test report.

Visibility is good enough so that from the driver's seat you can see the front bumper. Red leather upholstery was recently added for wear utility—and whitewalls just to show 'em we can be glamorous too. Now let's hit the starter, push down the clutch, throw her in gear and give the old girl a spin. Boy! what torque in low speed. I'll bet I could climb the side of a Quonset hut. On the turns she is as stable as a Pullman and the steering is as light as a feather (of course, I am not saying what bird the feather is off of). The large, skinny 19-inch wheels have been replaced with the 6.00x16 type. On the curves she holds the road like a Scotchman with a $10 bill.

Now for the Joe Dunstan acceleration tests. Hold on to your Stetsons. Zero to 50 took 12 seconds. That's right, 12 seconds actual. Speedometer was slow, registered only 48. I did get one run of nine seconds although it was in a dislocated Florida hurricane with a 90-mile tailwind.

During these tests I was even tempted to sneer at Cadillacs and Jaguars. This car has real prestige. It is 21 years old, just old enough to vote, but I haven't decided whether it is a Democrat or a Republican. However, I do know it has the strength of an elephant and makes a donkey out of every fool who tries to pin its ears back in traffic.

For you peasants who get a big laugh out of these old cars, brace your sides, Buster, cause this is a real automobile that was poluting the atmosphere with carbon monoxide vapors when your shiny new chromium sardine can was still a hunk of ore in an iron mine. As for your automatic transmission gizmos—phooey! On level roads this car starts out in high as smoothly as Joe Iturbi playing Beethoven's Fifth on the Steinway "88" and on hills a take-off in second gear is a cinch.

Now that I have sold you on this car, I don't expect you all to go out to your local junkyard and get enough old parts to build your own '31. But if the prices on new cars rise any higher—well, last one to the junkyard is a pedestrian.—*Joe Dunstan* •

NEXT MONTH—

Tom McCahill Tests the Sensational '53 Lincoln

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*E.N.J., New York

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700-16	6.76	760-15	6.06	750-15(10)	13.56	1000-20	17.96
750-16(6)	8.76	800-15	6.66	825-15	11.86	1100-20	20.96
550-18	5.16	820-15	6.66	600-20	9.66	1200-20	23.76
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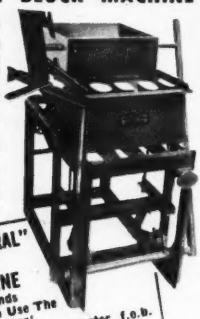

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Invention Clinic

[*Continued from page 24*]

(benzene) and 137 gallons of acetone.

A steel wire brush to break up the mass formed by treating the surface with a solution of ½ pound paraffin and 1 pound of phenol crystals in a gallon of benzol, is outlined in a patent issued in 1909 which also recommends a precipitating wash for the wax consisting of 4 parts of carbon tetrachloride, with one part each of acetone and grain alcohol.

Aqueous solutions of solid neutral bodies, for example: chloral hydrate, salicylates of sodium, potassium or ammonium, together with alcohols, acetones and ketones added to inert stiffening materials, were made part of a patent granted in 1912 to Carleton Ellis of Montclair, N. J.

In 1916, Ellis also protected the use of higher boiling point solutions, such as benzyl alcohol and many benzyl derivatives.

A combination of lye and Portland cement was recommended in a patent granted in 1925.

The use of acetyl chloride as the active ingredient in paint removers received a patent in 1950.

This outline gives the experimenter and inventor an idea of some of the methods which have been protected for paint removal. It is apparent that not alone is loosening of the adhering film a rather troublesome procedure but also involved is some method for getting rid of the loosened coating and restoring the surface so that it will be satisfactory for the new coat of paint. This means that all of the remover either must evaporate or must be neutralized and cleaned off. The use of rags is not satisfactory. Steam leaves the surrounding area in a messy condition. A vacuum has been suggested in a patent issued in 1909, while a water fountain and a watermotor-driven brush received a patent for this purpose in 1911.

[*Continued on page 47*]

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Invention Clinic

[*Continued from page* 45]

So far as the records are concerned, there appears to be no indication that high frequency heating, supersonics or adhesive tapes have been suggested for paint removal. The latter, particularly, should offer experimental possibilities. Nearly everyone has at some time or other applied adhesive tape to a painted cabinet or attached a paper to a wall only to learn that the paint peeled off when the tape was removed. Because this happens when no attempt is made to chemically loosen the paint it would appear that stripping could be improved with the development of chemical or physical inclusions into the tape's surface.

Another angle of approach would be to determine just what makes paint blister or peel. Obviously, if you can learn why and how it does so and can produce the effect at will, you will know both how to avoid the condition and how to use the knowledge for artificial peeling or blistering, hence removal.

Perhaps the ideal never will be realized, namely to strip off the paint dry and dust or blow away the residue. Better yet would be a surface applied to wood which always will wash clean and never need restoration. •

Next month—Heating Systems.

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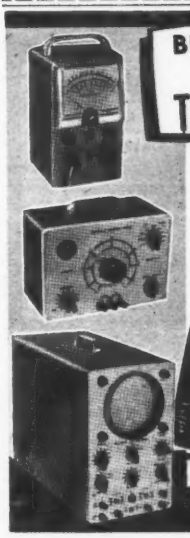

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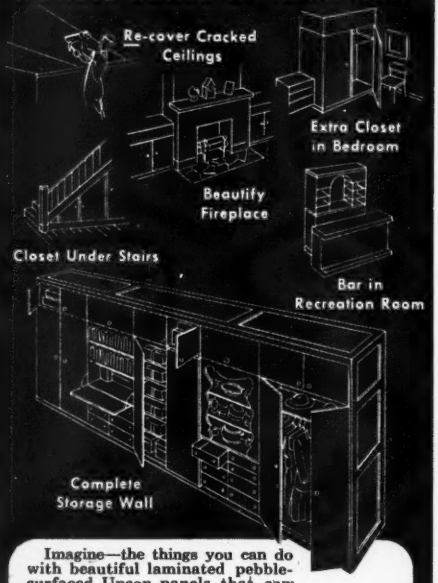

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continued from page 39

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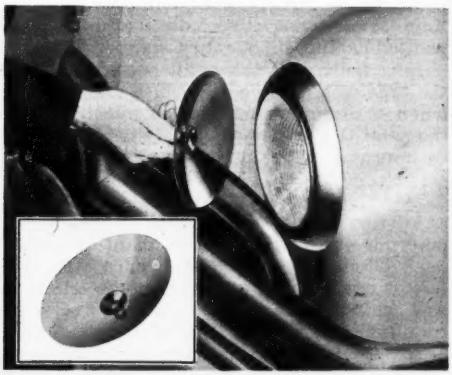

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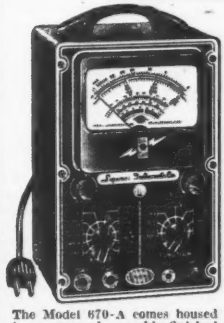

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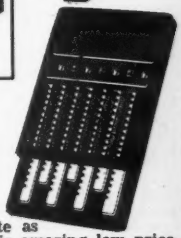

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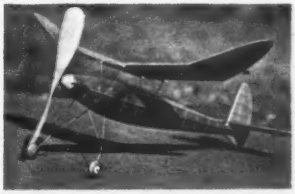

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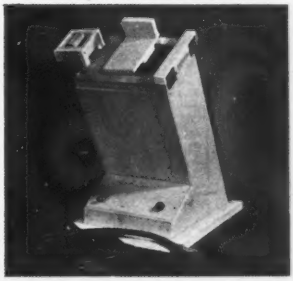

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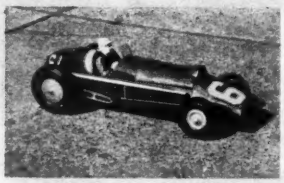

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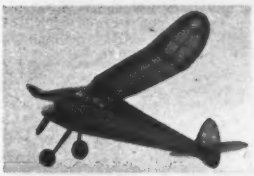

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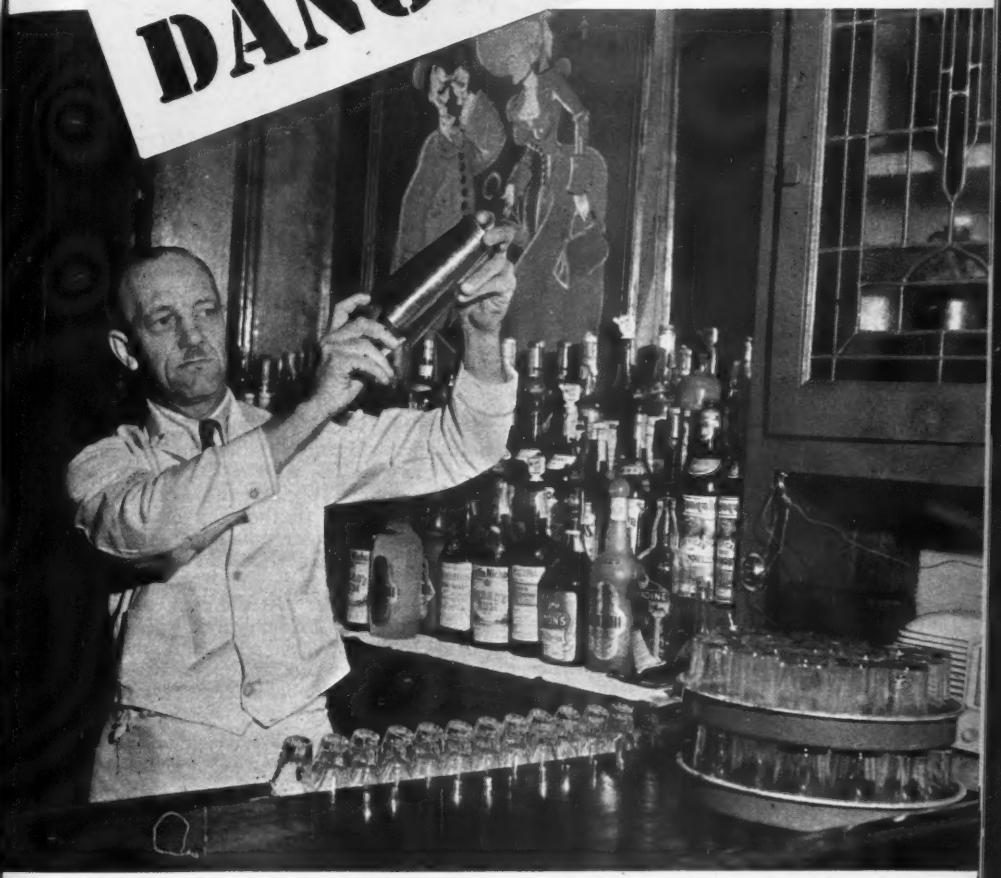
Here's why Nash uses Airflyte Construction: engineering tests prove that Airflyte Construction has more than twice the torsional rigidity (or resistance to twisting) of ordinary separate body-and-frame construction—and provides far greater safety to passengers by literally surrounding them with a protective steel cradle. Airflyte Construction eliminates almost two-thirds of the frame weight—resulting in greater performance and fuel economy. Airflyte Construction absorbs road shocks within the body structure, and eliminates body-bolt rattles—to give new concepts of quietness and comfort.

You can't appreciate the difference that Airflyte Construction makes until you drive a Nash. Your nearby Nash dealer invites you to see the beautiful new Nash Airflyte for 1953 and "road-test" this most modern of motorcars yourself.

Nash Motors

Division Nash-Kelvinator Corporation,
Detroit 32, Michigan



MEN AT WORK

World's most dangerous jobs are ones you'd least expect. How does yours compare?

By Lester David

G-MAN, ambulance driver, hospital cook, porter in a saloon, bartender, policeman, life guard and waiter. List those jobs according to their danger.

Now let's see how wrong you are.

You probably put the G-man, cop and ambulance driver at the top of your list. If you did, get ready for an eye-opener.

The most hazardous occupation in the

NO. 1: JET AND TEST PILOT ***NO. 2: AUTO, MOTORCYCLE RACER*** ***NO. 3: CARNIVAL ACROBAT***
NO. 4: MILITARY PILOT

MOST DANGEROUS JOBS

group is—believe it or not—a porter in a saloon.

Next most perilous is bartender. After that comes a waiter! Then come the hospital cook and cop followed by the safest of the eight jobs rated equally—G-man, ambulance driver and life guard.

This listing of job perils comes from a major life insurance company's occupational rating manual. In order to determine what premiums to charge persons seeking life insurance, each company works out its own method of rating. The decisions are based on the firm's own experience, a standard mortality table, how many policy holders it has, how much it costs to do business and other factors. But by and large, the risk ratings of the various big companies do not differ much.

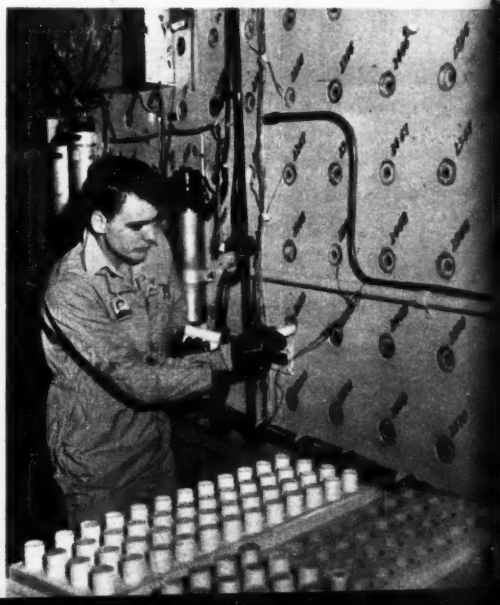
The New York Life Insurance Company won't write policies on the lives of porters in saloons, beer parlors, cabarets and similar establishments. Robert H. Bowles, senior underwriter, explains, "The last time companies made a joint occupational survey, mortality figures for these persons were found to be very high."

Another insurance executive pointed out the extra mortality in this case could be blamed on poor environment, danger from brawls and erratic hours. He explained that the non-acceptable jobs actually were those in the lower dives and taverns where porters were recruited from the ranks of down-and-outers.

A recent survey revealed that the death rate of bartenders was two-and-a-half times greater than for persons in office jobs. Why? In San Antonio a barman's jugular vein was severed by a broken beer bottle flying through the air and intended for someone else. In New Orleans a bartender stopped a .32-calibre slug. In Chicago one got in the way of a heavy chair being brought down on a patron's head. Things like that add up.

What are the dozen most dangerous jobs in America today? At the request of MI, the Institute of Life Insurance, spokesman for the industry, asked some of its member companies to scour their statistics and come up with the answer. This is the

Workers with radioactive materials (atomic pile, radium paint) usually rate No. 8 on danger list.



NO. 5: DEEP SEA DIVER

NO. 6: STEEPLE JACK

concensus in the order of their riskiness:

(1) jet and test pilots
(2) automobile and motorcycle racers
(3) carnival acrobats (not circus performers.
(4) military pilots
(5) deep sea divers
(6) steeple jacks
(7) chauffeurs trucking nitroglycerine
(8) radium sprayers
(9) radio and antenna workers (not TV service men but those working on towers)
(10) logging riggers
(11) riveters on steel construction
(12) blasters handling dynamite

These, the Institute says, are "generally not insurable," meaning few companies will risk gambling at any odds on how long the people in them will stay alive.

How risky is your job?

Generally, companies either charge extra premiums for persons engaged in hazardous work or advance the age of the insured. For example, a laborer in the coke industry who is 30 years old is considered having a life expectancy of a man of 40. Or a laborer in a caustic soda plant must pay an additional $5 per $1,000 of insurance yearly.

There is no advance in age or premiums —and hence no danger considered—for professional basketball players. Football players, however, are advanced five years, swimmers 10 and bicyclists 12 while prize fighters and wrestlers must pay extra premiums of $10 a year.

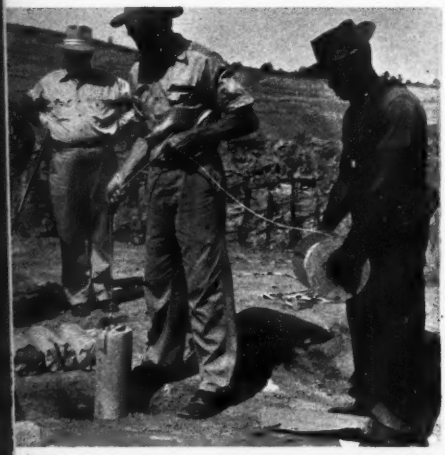
In the horse racing business, steeplechase riders can't get life insurance while handicappers, starters, trainers and trotting-horse drivers are advanced

Fireman's job appears especially hazardous but it's not so. Annual premium increase is $2.50.

Radio and antenna workers, aerial workers on high-tension power lines average No. 9 position.

G-man's job is safe, no extra payment. Not so a policeman who must pay $3.50 extra premium.

Logging riggers who climb trees rate No. 10 but riverman, shown here, is safer, pays only $5.00.



Man who plays with dynamite has no friend in insurance companies. His job is No. 12 on list.

five years. Jockeys must pay $10 extra.

For some reason, an actor's job is considered riskier than a booking agent's or stagehand's. Wild-animal trainers and circus aerial performers who work without nets are not accepted at all. A trapeze artist who has a net under him is advanced ten years if he is a leaper and seven years if he's a catcher. Topmen in perch acts are pushed up 15 years, racing and wild-west riders seven years and other performers five years.

Bartenders are advanced 15 years, thereby topping prison guards, house detectives, coal miners and bank guards.

Did you think that a nurse or male attendant in an insane asylum has a dangerous job, since he or she is in constant contact with psychotics who might fly into murderous rages at any time? Think again because the tables show that porters and servants in mental institutions have riskier jobs than nurses. The former are advanced five years while the latter and male attendants are not moved ahead at all.

Life guards pay normal premiums while waiters in places where liquor is sold move up eight years.

Among the other jobs considered too perilous for the issuance of policies are tunnel workers, farm hands and laborers, sponge fishermen and rodeo clowns.

How about those 12 most dangerous jobs? Why are they so considered? Well, take the most perilous occupation in the country today—that of jet test pilot—and look at one typical adventure.

Bruce N. Tuttle, 28-year-old jet tester for the Grumman Aircraft Corp., was alone at the controls of an F-9-F Panther not long ago, giving the plane its first workout in the air. He was streaking across the sky at a meteoric 650 miles an hour 33,000 feet up when suddenly—flameout!

The word strikes fear into jet pilots—the engine conks out, the jet dies. And when that happens six miles up at the speed of a comet, you're in trouble.

The way to combat a jet flameout is by diving earthward to make the engine windmill and maybe start again. Tuttle plunged for 13,000 feet but it didn't work. At 20,000 feet he leveled off and radioed his boss who was flying an amphibian nearly four miles below. He said he'd try to crash-land in the choppy waters of Long Island Sound, N. Y.

Down plummeted the plane. At 10,000 feet Tuttle kicked off his shoes and loosened his belt for a quick getaway. Down, down he went and the froth-flecked waters loomed closer. He hit.

The ship [*Continued on page* 160]

Flipping Car finally came to rest on its driver, Frank Luptow, killing him at Lakewood Speedway, Atlanta, Ga. Car's axle broke during race.

MI-stoppers

Trolley Holdup by Patrolman Sam Cohen of Philadelphia seems to title this photo. Actually Cohen is just looking.

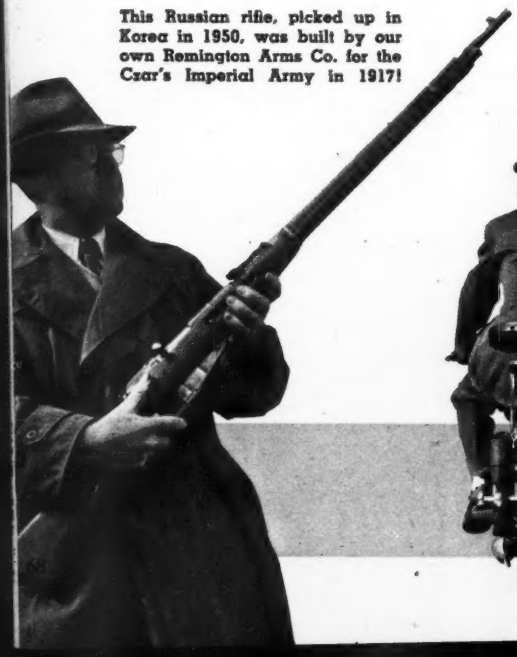
Bored is Charlie the Chimp at Silver Springs, Fla., probably because he has to look at the strange human faces all day.

Roller-Skating Rooster is Buster, gliding between a playmate's legs. Skates are taped to feet. He's catching on fast.

Two-man crew which operated this Soviet armored car didn't get too much protection from the steel plating. U. S. Army experts say it won't stop a standard armor-piercing bullet.

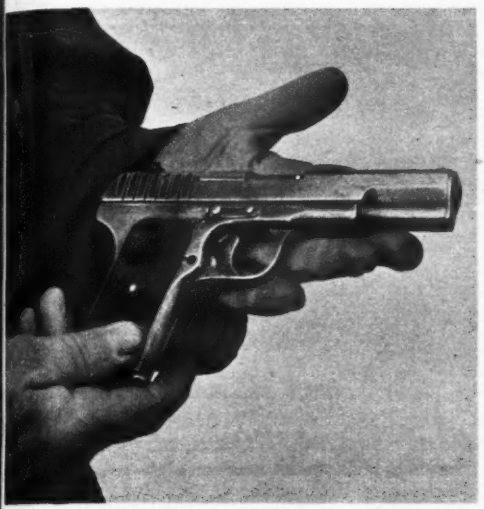
Commie Weapons from Korea

This Russian rifle, picked up in Korea in 1950, was built by our own Remington Arms Co. for the Czar's Imperial Army in 1917!

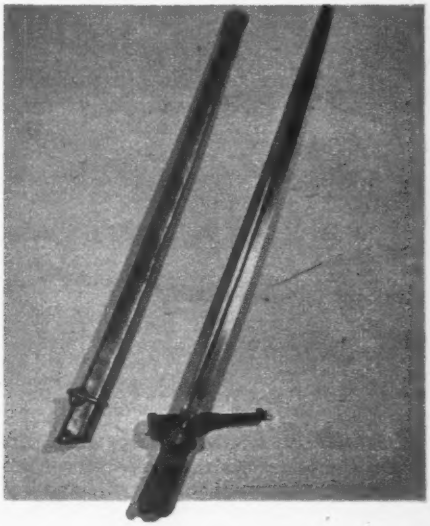


A couple of American G.I.'s go for a spin in a Russian-manufactured motorcycle and sidecar captured in Korea. Efficiently designed, it was found to be a direct copy of the original, world-famed German BMW.

Tokarev 7.62-mm semi-automatic pistol looks like the U. S. Colt .45 whose design the Reds swiped, then simplified. It costs less but kicks more.



This Japanese-conceived Luger-like pistol with sword attached was probably experimental. Very few of these combos have been used in battle.



Battlefield trophies serve a real purpose in helping our military experts to combat enemy tools of war.

Russian version of the Tommy gun, at right, fires the same bullet as the pistol, above. Many Red infantrymen carry this weapon.

Our Army Ordnance experts give very high rating to this Degtyarev light machine gun, shown below as it was being tested by a U. S. gunner. This piece, like the sub-machine gun, carries 7.62-mm ammo in its drum.

And here is a captured sample of the Russian 76.2-mm anti-tank gun, an all-around weapon similar to the one mounted on the T-34 tank. With other trophies on these pages, this one is displayed at Army Ordnance Museum, Aberdeen Proving Ground, Md.

NEW in SCIENCE

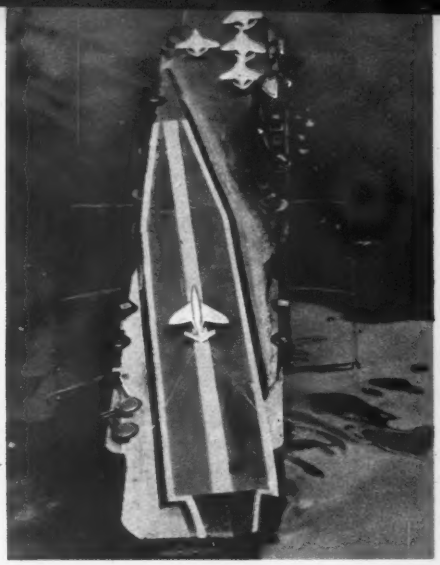
Beach Sifter has large roller with ports eight feet wide. Inside scoops revolve and pass sand into large sieve that catches debris and returns sand to beach. Inventor L. Emeny of Australia, made it after cutting his foot while in bathing.

Fish-Bowl Shoes show latest trend in ladies' footwear. (Or do they?) Model June Farmer shows them for Fortunet Shoe Co. They were exhibited at Shoe Travelers fair in Texas. Fish and water are put in through holes in heels.

Plastic Longies are what the well-dressed GI is wearing these cold days in Korea. It keeps him warm in sub-freezing temperatures and even keeps him and his full pack afloat if they should fall into water. Works on vapor-barrier principle.

Wide-Eyed Camera shoots a photo at 142-degree angle and when projected on screen, provides 180-degree view for person placed in proper position, making him part of scene. Trains Navy gunners, may find use in entertainment field.

Tiny Transmitter developed by Motorola is used to relay data from assembly line to main office. Easy to operate, will find use in such organizations as fire and police departments, and other groups where agents must contact headquarters.



Crooked Carrier is really angled deck devised by British and now being developed in England and U. S. Aircraft land and take off from runway set at eight degrees to fore-and-aft line, which is equivalent to increasing length 40 per cent.

Portable TV made by RCA weighs 27 lbs. and measures 12x13x7 inches. With built-in loop antenna it picks up channel five miles away, 15 miles with rabbit-ear antenna. Uses transitors instead of tubes except five-inch pic tube.

Firefly Police may be seen in Brunswick, Germany. Uniforms with cap, belt and sleeves made of fluorescent fabric were developed for use of night patrols. Only difficulty is they can't shut off their light like fireflies and crooks spot them.

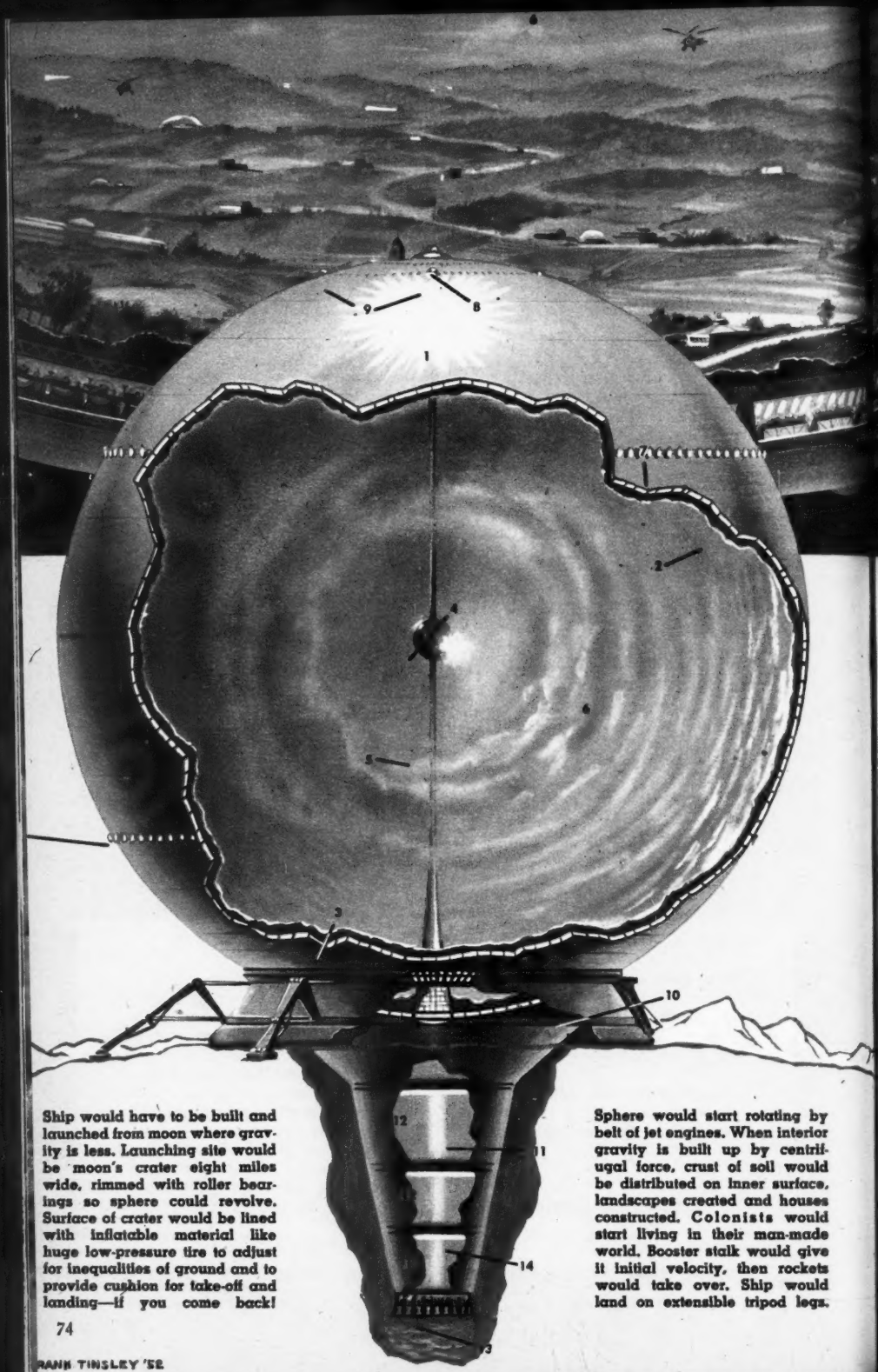
How To Get 25,000,000,000,000 Miles Away From It All

It's not easy. First build a space ship like this one, then, at the speed of light, it will take 30 generations to reach the nearest star.

By Frank Tinsley

FEW people realize the illimitable size of the cosmos in which they live. Even the nearest stars are separated from us by spaces so immense as to be almost incomprehensible to earthbound minds. Beyond lie black voids so vast that our whole solar system—sun, planets and satellite moons—is but a tiny pinpoint of light in a single galaxy of stars! The distances involved are so enormous that they are computed not in miles

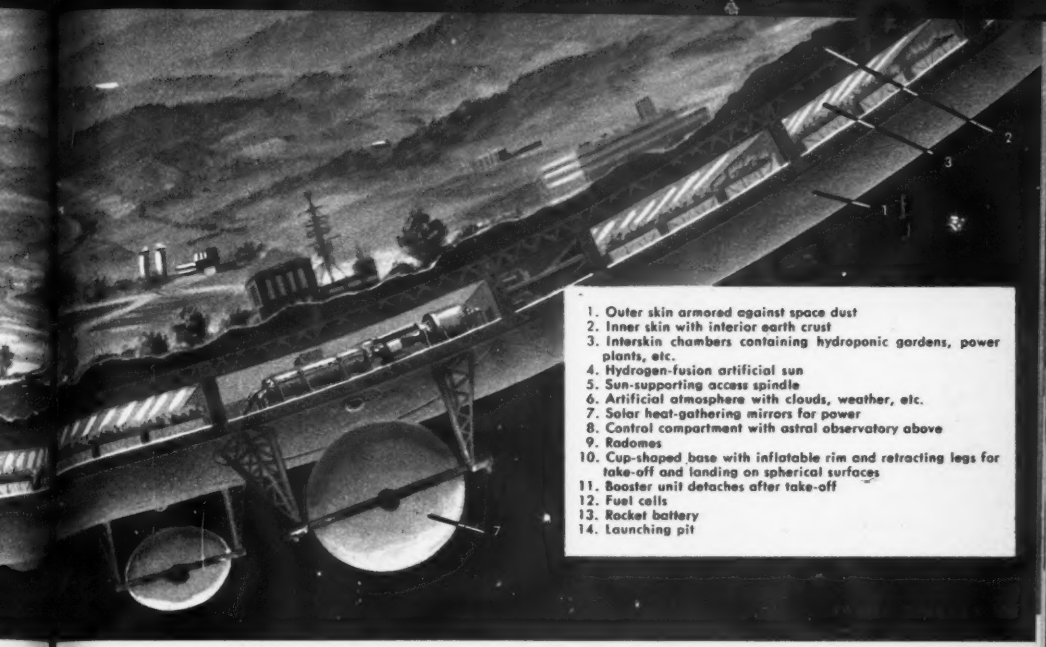
FRANK TINSLEY



Ship would have to be built and launched from moon where gravity is less. Launching site would be moon's crater eight miles wide, rimmed with roller bearings so sphere could revolve. Surface of crater would be lined with inflatable material like huge low-pressure tire to adjust for inequalities of ground and to provide cushion for take-off and landing—if you come back!

Sphere would start rotating by belt of jet engines. When interior gravity is built up by centrifugal force, crust of soil would be distributed on inner surface, landscapes created and houses constructed. Colonists would start living in their man-made world. Booster stalk would give it initial velocity, then rockets would take over. Ship would land on extensible tripod legs.

RANK TINSLEY '52



but in time. Astronomy's unit of measurement is the light-year, the distance traveled by light in one year at a speed of 186,000 miles per second. Multiply this speed in a year (670,000,000 mph) by 24 hours and then by 365 days and you have the basic unit. It is a cute, little pocket ruler 5,880,000,000,000 miles in length!

There are eight stars within ten such light years of our sun. Of these stellar neighbors, Alpha Centauri and Proxima Centauri are the nearest. Faint pinpoints of light visible only by telescope, they are a modest 4.3 light-years away.

Starting with a space ship of present day rocket performance, a top speed of around 6.2 miles per second, Dr. L. R. Shepherd, Technical Director of the British Interplanetary Society, calculates that at that velocity it would take about 130,000 years to reach one of these stars. Alongside of this, a trip to the moon would be a mere ferryboat ride! This trip would entail the birth and death of some 30 generations en route.

To contain such a colony, its animals, plant life, etc., the space vehicle would have to be a modern Noah's ark. The problems involved in maintaining artificial atmosphere and armoring the hull against cosmic dust particles make a spherical form almost obligatory. It would have to be enormous with a minimum diameter of ten miles. It would have to revolve around its directional axis to provide artificial gravity through centrifugal force, yet have fixed polar areas for astronomical observation, navigation, etc. It would have to take off from the moon where the gravitational pull is only one-sixth that of earth.

In the sphere, life would be conducted as nearly as possible as it is on earth. The whirling globe would contain towns and countryside, soil for crops, trees, lakes, roads and houses. There should be a sky above, an artificial reproduction of our atmosphere with a sun, moon, stars, day and night and even the change of seasons. In short, our space vehicle must be a small, self-contained world with all the features of our natural one. The only major difference would be that our colonists must inhabit the *inside* of their man-made planet instead of its exterior!

The design and construction of this monster globe is no short term proposition. It is a job for several generations—perhaps centuries!

The globe itself would be double-walled, with an armored outer skin and an inner pressure hull to hold the atmosphere. The space between would contain a tremendous area of hydroponic gardens, lit by artificial sun lamps and fed by chemical fertilizers for the manufacture of oxygen by natural plant processes. The outer skin would be pierced by rows of observation ports, radar domes and belts of solar heat plants.

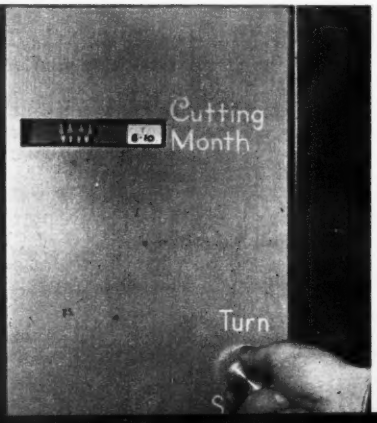
Science-fiction? Maybe so, but it's your vehicle if that's where you want to go. •

Pressing a button which lights up the interior, a visitor to the Cleveland Health Museum discovers what a stomach ulcer looks like, left. Children learn more by this method than by hours of dry classroom lectures.

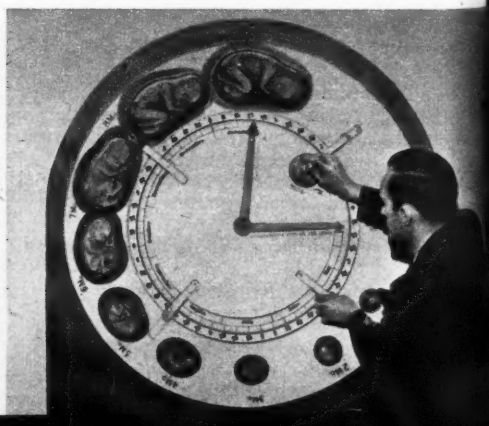
push-button health museum

Learn about your own body at Cleveland's clearing house for health and you'll live longer.

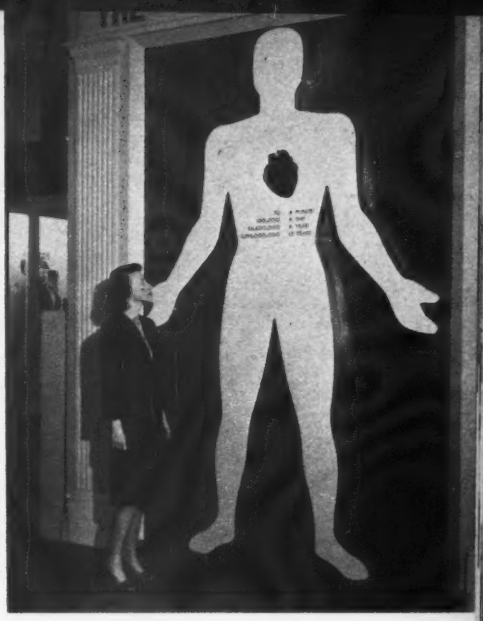
If you're anxious to find out about baby's first set of teeth, twist dial on right and the setup of an infant's mouth at various stages appears on left.



In the Mother and Child Room, visitors can operate gadgets which help explain the mysteries of birth. Revolving board shows development of the embryo.



Vitalometer, left, tells you about your lung capacity while you study a chart, right, which gives you the lowdown on your respiratory system.



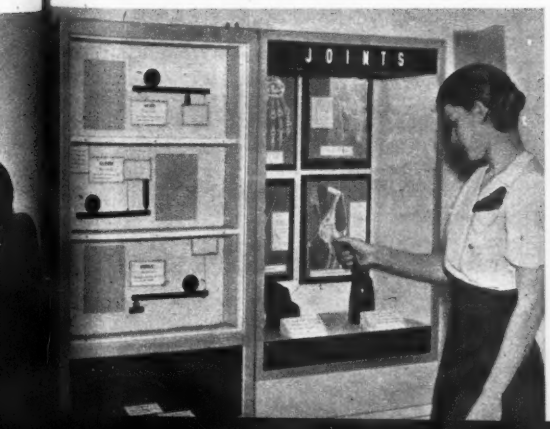
Huge statue possesses an artificial heart which beats regularly with a sound heard throughout Museum. Red light flashes with each beat, too.

CLEVELAND has a museum where you can push a button, whirl a knob, pull a lever and discover that premature death has taken a back seat. Guided by Dr. Bruno Gebhard, the non-profit Cleveland Health Museum is the first and only one of its kind in America. Through approximately 3,000 visual education exhibits, the Museum demonstrates that man can live longer if he understands his body.

Here is a museum where the "don't touch" policy doesn't apply. Officials want the public to push the buttons, to test their lungs on the Vitalometer, to let Junior crank the gadget which teaches him how to brush his teeth. They want their visitors to have fun and yet to learn about their bodies and their health. •

Curious Health Museum visitor works lever which controls apparatus which in turn demonstrates the operation of various joints of the human body.

Body Book is wooden bust of a man cut into sections which reveal various portions of the body. It's a very simple way to learn about yourself.



On the triangles are written commonly accepted statements about food. When you lift the flaps, their truthfulness is revealed.

L. B. Wagner uses compression test to determine quality of beat-up golf balls sent to him. Many are too bad, discarded.

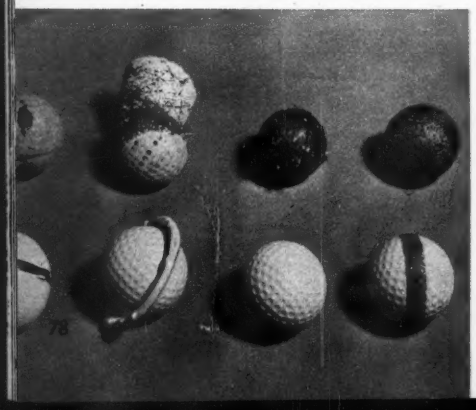
Golf Ball Doctor

L. B. WAGNER of Santa Monica, Calif., likes to call himself the golf ball doctor. He reclaims used golf balls. He has a big-little industry, the Metropolitan Golf Ball Co., which is in a "fair way" to become first in the field.

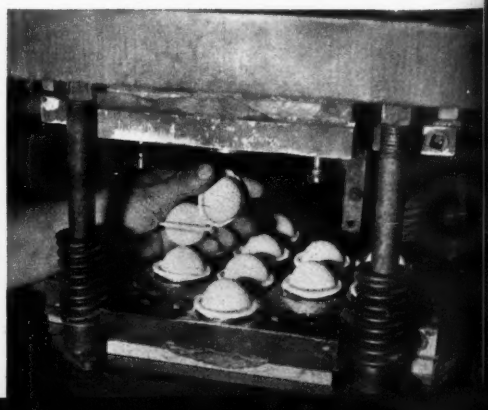
Wagner started in the rough, literally. At the age of 12 he set up his own business hunting for lost golf balls in the roughs and swamps adjoining the old Jackson Park course in his native Chicago. A good lost ball could be resold for 25 cents.

Today, still dealing in used golf balls, he takes the ones sliced up by hapless duffers, strips off their old balata skins, rewinds them to size and hands them back in a gleaming new plastic covering which is tougher and better than the old. •

Golf ball in phases of recovery. First the ball is stripped, peeled to 1½ inches diameter, rewound, then new plastic cover molded in place.



Electric air-operated molding press bakes new plastic covers on balls. Temperatures up to 300 degrees weld plastic hemispheres together.

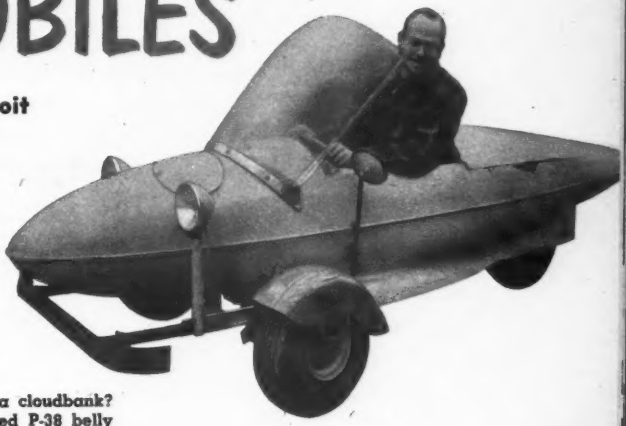


To the business section of an old motorcycle add one junkyard auto frame, blend in an ex-plane cockpit, and what have you got? This.

Wild blue yonder also inspired E. H. Kantz, Dallas odd-mobilist, to install a double bed, stove and icebox in this 50-mph reformed fuselage.

ODD-MOBILES

Determined to prove Detroit doesn't know everything, these daring inventors came up with these ? ? ?



What's this? Another fugitive from a cloudbank? Right. It's Emory Stanfield's converted P-38 belly tank. One-lung engine drives it at a snappy 40.

You've heard of Jeeps, Peeps and the Creeps. Now meet the Weep, a conglomeration of parts from 16 cars, a tractor, a mowing machine and a sailboat.

Robert Mustand, of Wellsley, Mass., had a window seat, a motor, some wheels, wood, metal—and a great idea. "Mustard Seed" goes 50 mph—he says.

BE A MEMORY WIZARD

No matter how bad your memory may be now, Dr. Bruno Furst can show you how you can improve it until it's almost miraculous.

By Douglas Greene

A CHILD'S life was at stake.

The three-year-old Chicago boy had climbed to the medicine chest, explored its contents and swallowed some liquid from a bottle.

Frantically his parents telephoned their doctor, but he wasn't at home. They called the police—the desk sergeant asked what the ingredients were in the medicine. The boy's mother replied tearfully that it was a liniment, to be used externally, but she

Miss Vivian Donner, fashion commentator for news reels, found course helps in work.

Richard Thomas, Dumont TV commentator and lecturer, memorizes talks, news casts.

Red Buttons, comedian on CBS-TV, took Dr. Furst's course and now memorizes entire show.

didn't know what ingredients it contained.

"Then give me the druggist's phone number," the sergeant said crisply.

He called the store—but it was early Sunday morning and there was no answer. The sergeant looked up his home number, called him there.

"Can you get over to your store and look up a prescription you issued last year?" he asked. "It's a poisoning—emergency." He told him the date and prescription number.

Without hesitation, the druggist replied: "I remember the medication." And he recited the ingredients and the antidote!

It was administered without delay and the child recovered. The druggist's phenomenal memory probably had saved the little boy's life.

It was one dramatic instance of how your memory can be of invaluable service to yourself and to others.

It sounds incredible but practically anyone can improve his memory to the point where he can memorize the contents of newspapers and magazines, rattle off the populations of dozens of cities and remember the names and faces of everyone he has met. So says Dr. Bruno Furst, a world-famous memory expert who has been called America's best all-around mental athlete.

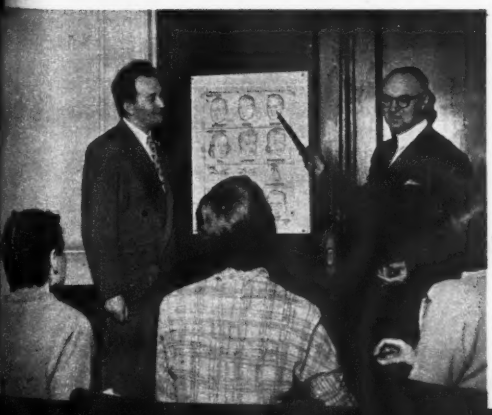
"Your memory is like a muscle," he declares, "weakened by disuse and strengthened by exercise. There is no limit to the capacity of the human mind to acquire and retain information."

How much better off would you be in your job, business or profession if you had those vital names, dates and telephone numbers right at the tip of your tongue? How much farther could you advance if you could come up with the right answers just when the boss, customer or client wanted them?

A salesman for a large manufacturer of children's clothing in Paterson, N. J., walked into a customer's shop recently in his upstate New York territory and made his pitch for an order. His firm puts out more than 150 different garments.

Without consulting his catalogue, the salesman rattled off style numbers, prices for wholesale lots, minute descriptions.

Dr. Furst, with pointer, demonstrates his face-type chart used to help tie together facial characteristics with sound of an individual's name.



Miss Marjorie Insinger, teacher for John Robert Powers, finds no trouble memorizing Mechanix Illustrated, linking page numbers to contents.

Graduation at Dr. Furst's school. In addition to classes throughout U. S., he conducts correspondence course from 251 West 92 St., N. Y. C.

Mrs. Furst, standing, instantly memorized three bridge hands while dealt. By elimination, read off hidden hand. All students quickly learn this.

Miss Cole, student, mentions number of card. Dr. Furst, by linking its number with picture on card, describes its appearance in exact detail.

And that wasn't all. Although he hadn't seen the customer for seven months, he recalled specific facts about his last visit.

"Your wife was expecting the last time I saw you—how is the new baby?" he asked amiably. "And I hope your oldest daughter Marcia got over that nasty head cold she had. And say, how did you make out on that fishing trip you were taking that weekend? How did that last order sell—you took 35 pinafores, sizes one to seven; 25 blue jeans and two dozen party dresses, sizes three to eight, the $6.75 ones."

The store owner was flattered and impressed. Especially since a rival salesman, who had been in only the day before, had made the blunder of trying to sell him more of the same clothing that was still clogging his shelves. And the storekeeper had written that the stuff was moving poorly, too, but the salesman had forgotten the complaint.

The man with the sponge-like mind had a distinct advantage. He came away with a whopping order.

Many of the world's most noted people have excellent memories, and it is not just an isolated peculiarity. It is one strong reason why they have vaulted into prominence.

James A. Farley, former chairman of the Democratic National Committee, has one of the world's most famous memories. Farley remembers the names and faces of more than 20,000 persons. Experts of the political scene have admitted that this faculty was a great help in winning the election for Franklin D. Roosevelt in 1932.

Less well-known is the fact that Gen. George C. Marshall has an astonishing memory, once described as "the envy of all his associates." He proved it once in dramatic fashion. At a press conference in Algiers while he was chief of staff of the U. S. Army, General Marshall told a group of 60 correspondents: "To save time, I am going to ask each of you what question you have in mind."

Each reporter thereupon asked a question, some long and involved. The general listened intently, then launched into his talk. He spoke for almost an hour and the correspondents were flabbergasted because as he spoke, he answered each of the points raised—and as he answered, he looked directly at the reporter who had asked the question, proving that he remembered not only the query but the man who had made it!

Now take stock. How's *your* memory? Is it as bad as the father who took his young son to a ball game at Brooklyn's Ebbet's Field last [*Continued on page* 183]

Hendricks, standing, helps Bourcy-Beckley go over some of the million cards selected from four million.

Three-dimensional appliqued post card was outlawed by post office because special handling for stamping was needed.

Deltiology—Newest Hobby

DELTIOLOGY, the study of small pictures, is the name given by the Post Card Collectors Club of America to its hobby which President Bob Hendricks hopes will someday rival stamp collecting in popularity. Headquarters is in Los Angeles where member W. Bourcy-Beckley is busy cataloguing his collection of one million cards. Their value depends on age and rarity; message is unimportant. •

This letter was sent by originator of birch bark post cards, Herbert Lee of Pemaquid, Maine, to his father to tell him of his new mail idea.

A young man in Sicily sent his girl in Florence, Italy, this greeting, "Remembering you. Dini salutes you," on the dry leaf of a lemon tree.

MI tests the '53 Buick Roadmaster

By Tom McCahill

More chrome trim, a pronounced rear tail fin, new front-end styling and wheel covers hailing Buick's V8 engine are the main body changes in the '53 car.

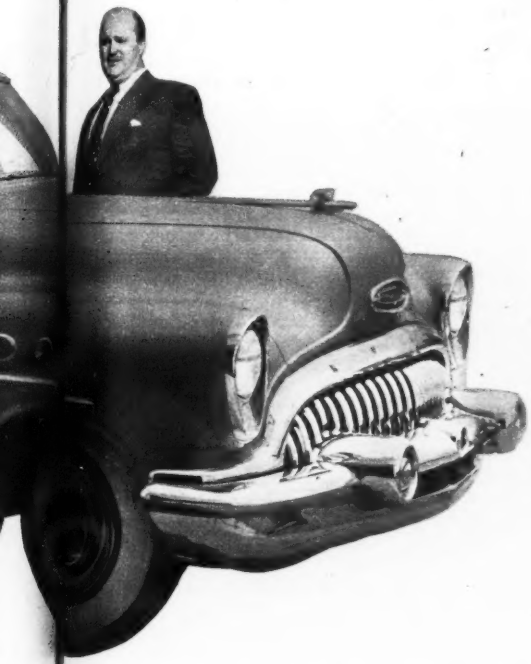
THE 1953 Buick Roadmaster is a new car. It is new from the entirely different V8 engine all the way down to its fake wire wheels (optional).

The top news at Buick is the power plant. This big 322-cubic-inch egg beater develops 188 horsepower and is as smooth as a bucket of warm Vaseline. It is the latest of the V8's and among its features is a vertical valve arrangement instead of the usual inclined design. At a quick glance this makes the new engine look like two four-cylinder jobs tied together. The compression ratio is 8.5 to 1 and, with the four-barrel carburetor introduced last year, this job unravels like a junior hydrogen bomb.

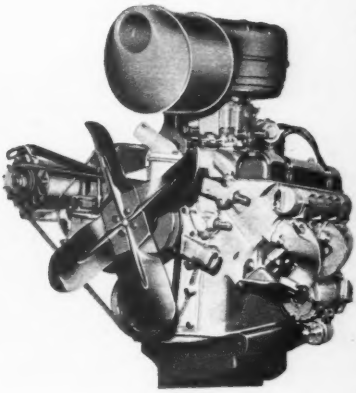
Another real addition to the new Buick is the return of the 12-volt electrical system. This revival will be seen on many new cars in the next few months. The 12-volt system, almost universal with all imported cars, was dropped on these shores back in the days when gramp cut a sharp figure in his Leland Lincoln. The reason it was banished from the American scene was that ugly old joker, price. Six-volt batteries were cheaper to manufacture and even the wiring and insulation could be sleazier.

With the current raising of compression ratios, demanding a hotter spark to fire up, and the addition of electric windows, two-speaker radios and many other electrical gadgets to American cars, the poor old anemic six-volt battery just didn't have enough moxie to do the job, especially in cold weather. The 12-volt system is a better

"A junior hydrogen bomb" is the way Uncle Tom describes the new 188-horsepower V8 engine which can hustle the big Buick over the highways at a true 103 mph.



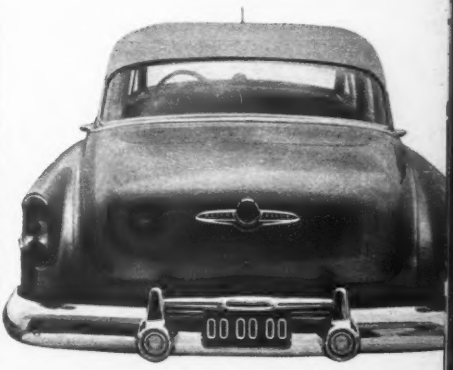
Parking and signal lights have been taken out of the front bumper bombs, above, and relocated under the headlights. Familiar hood ring was recessed, bumper was beefed up.

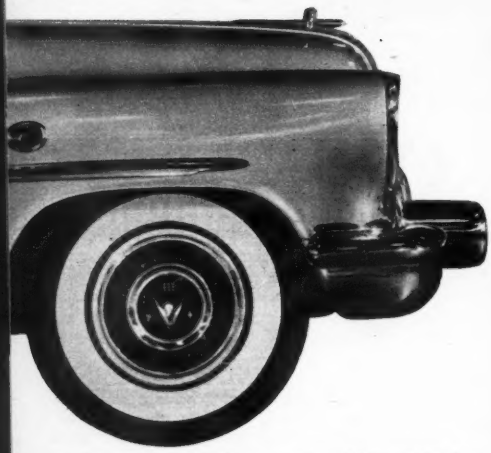


One-piece wrap-around rear window makes the Roadmaster look even wider than it did. But the big news this year is the V8 engine, 180 pounds lighter, 18 horses huskier than the previous straight 8. It has 8.5 to 1 compression ratio against former 7.5 to 1.

ignition set-up all around. It will get a hotter spark to the plugs and keep it hot at higher speeds. And for that cold morning start, it has the extra punch that means starting under conditions that would leave the six-volt system a gasping, groaning failure. I feel you can look for 12-volt ignition systems as standard in Detroit within two years.

One of the big wing-dings of 1953 Detroit is the rebirth of wire wheels and, in the case of the 1953 Buick Roadmaster, strictly fake wheels. When Bill Parker and your Uncle Tom arrived at the Flint home of Buick we saw cars equipped with every type of wire wheel from the real McCoy Italian Borrani to Michigan versions and the Roadmaster's Massachusetts camou-





Optional wire wheels are eye-catching—but fake. The spokes are set in rim of a disc that snaps over standard solid wheels, available on all models.

flage jobs. From a short distance the Roadmaster's wire wheels look as genuine as the ivory in an elephant's tusks and give the 1953 offering a brand-new look and quite a lot of added style.

Actually, the spokes are set in a wheel-covering disc that snaps over standard solid wheels. Of course, these are as truly functional as the bags under Fred Allen's eyes. On my last Detroit junket I found real wire wheels available as extra equipment on many 1953 cars from the low-priced Plymouth to the Packard. On Buick's Skylark, for instance, the wheels are real Borrani. This Skylark, as you may know, is the convertible that Buick calls a sports car. It would be just as appropriate to call your Uncle Tom a ballet dancer because I can spin until I land on my duff, which is what I suspect the Skylark would do if it tried to follow a real sports car through a hard turn. Wire wheels won't make a sports car any more than a sport coat makes a sport.

MI Editor Bill Parker points to the 12-volt battery re-introduced by Buick. Tom says 12-volt system will be universal on American cars before long.

How about this trend toward wire wheels? From a looks standpoint, I'm all for it, but from a practical standpoint wire wheels are as out-dated as Milton Berle's jokes. Brake cooling is the only actual redeeming feature to recommend wire wheels but this is no longer necessary on more modern sports cars. Lightness, another former feature of wire wheels, has been negated by the use of lighter and stronger magnesium in disc wheels. Air-cooling scoops that force cool air on the brake drums have replaced the open-air cooling of the wire wheel just as pressure lubrication has surpassed the old crankcase splash system. Wire wheels are good-looking—and hell to clean. Period.

The big pitch is how does the new V8 Buick Roadmaster get over the ground? This, kiddies, is a fact, so get a good grip on your seats. The new Buick Roadmaster I tested on the GM proving ground *averaged,* over a two-way run, 103.4 miles an hour. This makes the Buick Roadmaster for the first time a member of the exclusive 100 mile-an-hour stock car club. Before the year is out, several others will also make the grade, two of which I have already tested though not reported on as yet. But this is the first time a Buick even came close to 100 mph since the days of the pre-war Century. This year at Daytona I expect several cars to pass 100 but whether Buick can do it against the drag of the sand remains to be seen. However, Buick can do a true 103.4 average on a hardtop road and that does put it right up there with the golden few in the high-speed department.

An extra turbine wheel has been added to the Dynaflow transmission, boosting the pickup and general performance of this unit considerably. It seems to lock up in the cruising ranges better and at speeds of 30 or more there seems to be far less slippage than before.

The Super also has the V8 engine this year. The specifications are about the same except that its maximum torque is 292 foot pounds at 2200 rpm (compared with the Roadmaster's 300 at 2400), it develops 170 brake horsepower at 4000 rpm with Dynaflow and 164 with synchromesh (compared with the Roadmaster's 188 at 4000 rpm), and has a two-barrel carburetor instead of a four-barreler. The Special, with slightly [*Continued on page* 177]

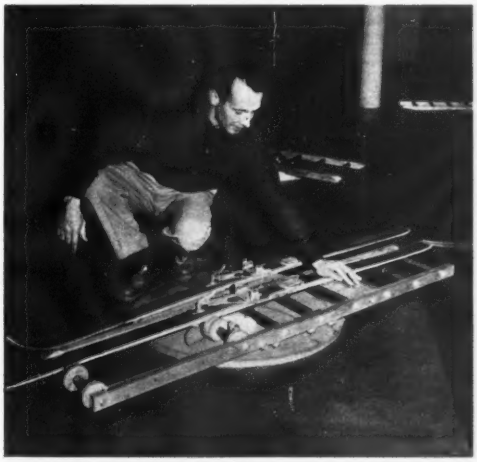
Learn To Ski Indoors

SHOULD you see some normal-looking people shouldering skis and heading for East 86th Street in New York City instead of the mountains, don't think they are daffy.

This scene has become common these days in this metropolitan neighborhood. The ski-toters are headed for the Parallel Ski School, located on the fourth floor at 164 East 86th Street. Unlike anything that looks like a winter resort, the large matted room of the school is not cold and there are no snow, mountains, rocks or pine needles.

Scattered around it are ladders with rollers as rungs, ladders that revolve on steel discs equipped with brakes, and other training gadgets invented by Henry Rist.

Rist, an experienced skier, designed his machines four years ago, discovered they were just what students needed. •



This machine, a ladder with rubber-covered rungs, teaches the student the difficult ruade. Red and green lights show the tyro if he does it correctly.

With this automatic ladder and turntable, Rist teaches a novice the proper crouch for balance and turn. He uses the French Parallel Method.

Gelaendersprung, maneuver by which skier jumps over an obstacle in his path, is difficult, not required in Henry Rist's elementary skiing course.

In one corner is a shop where skiis are fitted, repaired. Average student needs ten lessons. In winter, classes take trips to mountain slopes.

McCahill Drives the English Morgan

Uncle Tom gives another little British sports car a close look and a fast workout in an effort to find out how it compares with the very popular MG roadster.

"A SNOB'S MG" was my first impression of the semi-rare English Morgan Plus Four. We had been trying to get one of these highly controversial baskets to test for some time. But as fewer than 100 cars a year seem to be the production zenith at the factory, and as most Morgans are sold long before they are built, it took us quite a while. Joe Ferguson of Fergus Motors, New York agents, finally uncorked one for me and here it is.

From a baseball pitch away the Morgan looks very much like the popular MG but as you close in for a real visual inspection you find that the two cars differ in many ways. The Morgan's classic, unstreamlined profile of box-like angles goes back to the Mercedes K and SS schools of the late 20's and early 30's. This type of styling, still popular with many sports car fans, is one of the top reasons for the MG's continued popularity. It is sports car design in the real sense though it is a long way from modern race streamlining. The German Porsche is a good example of modern competition design where wind resistance is cut to a minimum. But many fans still feel the MG's rugged look makes for more of an all-around sports and fun car. On a recent survey I made of non-owning sports car fans I was surprised to find that the majority rated the MG over the Porsche in looks, even though the Porsche design makes a lot more sense for competition.

Continuing our inspection of the Morgan, we find two spare wheels and tires in a deep rear tire well. Two spare tires left the American scene just after Garfield's inauguration but they give the Morgan a distinctly rich looking touch. The top, and I use the word loosely, is unique. In fact, it's a dilly. It is a cross between a Bikini bathing suit and Sherlock Holmes' old mackintosh. To erect it, you first put up

the bare-as-a-fish skeleton frame and then, so help me, you button on the flimsy fabric. It's all very interesting but I'm sincerely glad it wasn't raining while I made my test.

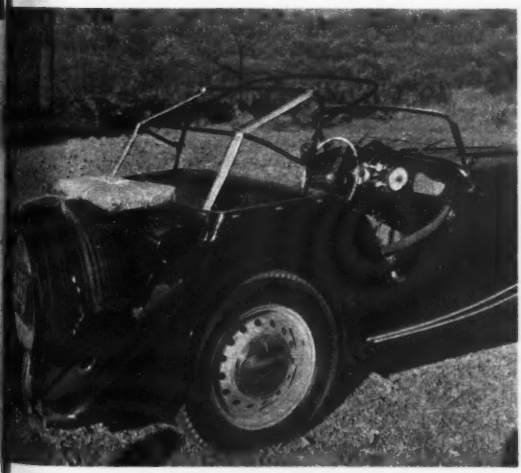
The instrument panel comes off second best on inspection and the lack of a tachometer on this type of rig is like having a toothbrush without bristles. The windshield wiper motor is located in the best spot for de-knuckling your right hand on a fast wheel cut. In all, the instrument panel can be summed up in the word of that great emancipator, Herman Aerosol Bomb, as lousy. The Spartan panel is, however, complemented by the finest of leather upholstery, equal to that of any $10,000 showpiece.

The paint job lends a rather weird touch. These cars are all hand-painted by one guy who seems to wield a very unusual brush. It's something to be able to tell the boys at the saloon that you own a hand-painted car. But aside from this doubtful advantage I could find nothing to recommend Detroit's following suit. The steering wheel is unadjustable, unlike most of the Morgan's sports car contemporaries. Price-wise, the Morgan has in the past sold for around $2,300. Recently this price was boosted to more than $2,800 which this writer feels calls for even closer inspection. What has the Morgan got to make it worth that much dough?

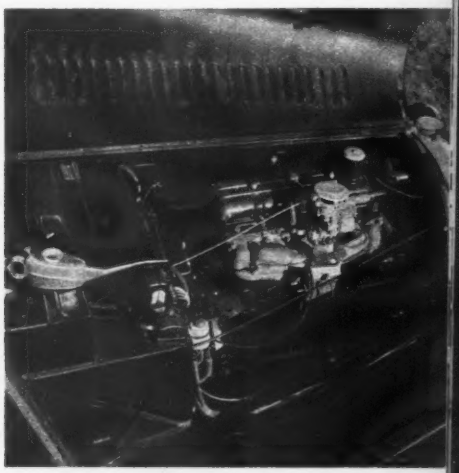
Jim McMichael, an old MG driver, drove this roller skate out to my house and for the next two days we tried hard to find the answer. My first impression on getting behind the wheel was that if I sneezed real hard I'd bust this bucket wide open, like an over-fermented bottle of beer. The elbow room for two six-footers, weighing in the ugly neighborhood of 250 each, left a lot to be desired. Before turning the key I felt that the whole job was slightly on the scant side—but turn the key I did.

My first surprise came when I shoved the throttle wormwards and the Morgan shot ahead like No. 4 shot after a Mallard. This satchel had dig that would smother any MG in a whirl of exhaust fumes. Before getting into third gear I knew I was driving a bona fide sports car in the best hell-for-rubber tradition. The exhaust was

The Plus Four Morgan 2-seater's box-like design is typical of the so-called "classic" sports car.



To put up the Morgan's top, you first erect the framework and then button on the canvas covering.



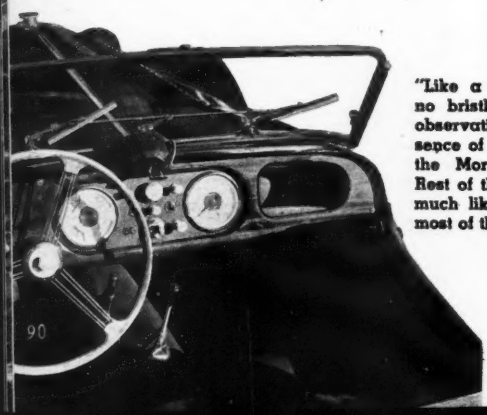
Four-cylinder engine, developing 68 horsepower at 4200 rpm, gives the 1,500-pound car real snap.

Remarkably close resemblance between the MG, at left, and the Morgan is evident in this picture. Man at the right is Jim McMichael, well-known MG driver who has often raced against McCahill.

deep and rich and the car took the road ripples like a rock crusher. The ride was manly and as harsh as a brassie shot. Looking out over the long, lowered hood as we bowled into the first corner, my thoughts chased back to my first Bugatti test many years ago. The driver's steering wheel view is very much like that from so many famous Bugs and the accompanying ride was also similar. Into the corner I found the Morgan cornering flat but there was just a mite of tail breakaway.

On a corrected speedometer the Morgan got up to 30 in 4.5 seconds and hit an honest 60 mph in 15.7 seconds. This is flash performance in any league but especially when you consider the paper-weight size of the car. But here's the catch. The Morgan has a comparatively big 4-cylinder, 2.1-liter, 127-cubic-inch engine as compared to an MG's 76-cubic-inch, 1¼-liter splutter box. This big engine gives the Morgan the torque that whips it away from an MG like a canvasback duck passing a chicken. But by the same token this size also defeats the Morgan as a road race car. Due to its displacement it would have to race on even terms with the Aston Martin, the 2.1 Ferrari and others of similar ilk. Against these top bananas the Morgan would stand as much chance as I would in a hair-growing contest. Oddly enough, despite this size the Morgan only develops 68 horsepower at 4200 rpm. In a top speed run my money would ride with the Mark 2 MG every time. The Morgan's top speed averages between 82 and 84 miles an hour; my Mark 2 MG made one run at Daytona Beach last winter at 85, in spite of a four-mile-an-hour drag from wet sand. At anything below top, however, the agile Morgan would kill my MG.

The Morgan has some outstanding qualities, one of which is hill-climbing, in which department it would tear many and mightier vehicles apart like a broken bale of sawdust in a hurricane. On my test hill, which only two cars had previously made in top gear from a standing start, the Morgan walked right up without a balk. A hot Mark 2 MG can just make it in second. In top gear, with just a short start, this Morgan became the only regular production sports car ever tested on this hill that made it all the way in high—and this includes XK 120 Jags but not Allards or Cunninghams, which haven't been tried but I'm sure could do it. Naturally, the real enthusiast will blow his top at this, claiming (and rightly so) that a real sports car has gears that [*Continued on page* 174]



"Like a toothbrush with no bristles," was Tom's observation about the absence of a tachometer on the Morgan dashboard. Rest of the panel is very much like that found on most of the imported cars.

THIS MONTH'S PRIZE

gadget

SHAKE SHARP RAZOR

WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Gadget Editor, Mechanix Illustrated, 67 West 44th Street, New York 36, N. Y. Each month the best entry gets a cash prize of $50.

Franklin Pesce discusses the latest model with James Friel. Razor will be marketed by Volume Sales Outlet Co., 1209 Oregon Ave., Phila., Pa.

NECESSITY certainly proved to be the Mother of Invention with James Friel's Shake Sharp Razor. Friel, who is a salesman, had a very sensitive skin and felt every little knick and burn from a rough shave.

One morning he had a particularly burning, irritating shave. A barber told him that lotions and soaps were not the answer and that a cool, clean shave could be obtained only by using a sharp blade. He began to wonder why a razor could not be perfected that would always keep a blade sharp so that every shave would be crisp and clean. He made some rough drawings and discussed them with a fellow inventor, Franklin Pesce, President of Volume Sales Outlet Company.

After much research, they came up with the answer. The Shake Sharp sharpens a double-edge blade with a flick of the wrist. A permanent bar hone slides back and forth across the edge of the blade as the razor is shaken and increases blade life to 100 shaves. This eliminates buying new blades but most important, every shave is just what you want it to be. •

1905 CADILLAC

Owner: Jerry S. Foley, Jacksonville, Fla. Model F. Engine: one-cylinder, 9 horsepower, twin ignition. Transmission: planetary, two speeds forward. Tires: 28x3. Color: body green, wheels natural. Original cost: $850. Top speed: 20 mph.

MECHANIX ILLUSTRATED

PIN-UP CAR

NEW for the ROAD

Baby Carriage Rack is a new feature on the 42-passenger buses being built in England for New Zealand. These "perambulator carriers" would be a total loss in traffic of large American cities.

Aero-Cycle designed and built by Malcolm Reece of Southampton, England, is a tricycle driven by propeller. Engine is a 98-cc two-cycle model and is reported to blow the vehicle along at a steady 30 mph.

WIN $25

Send in a sharp, glossy photo of a snazzy car, old-timer or new, posed as at left with owner or a pretty gal. Include self-addressed, stamped envelope (just in case) and all vital statistics about car and owner. Mail to Pin-Up Editor, MECHANIX ILLUSTRATED, 67 West 44 St., N. Y. 36, N. Y.

RR Jeep called Hy-Rail has caboose body and flanged wheels to keep it on the tracks. Guide wheels are raised and lowered hydraulically so jeep can leave tracks at convenient point to switch to road travel.

D-Skidder for ice and snow driving enables the driver to lay down his own sand track when the going gets tough. Has foot-control button, fits any '47 to '53 car. Connecticut Tel. & Elec. Corp., Meriden, Conn

A MONEY-MAKING

idea

Artist In Veneer

This was Jack Arzonico's toughest project, an inlaid reproduction of the American Telephone Company's medallion, over 2,000 pieces of wood cut with penknife from 24 different varieties.

By H. W. Kellick

SOME artists create masterpieces on canvas with oils and brushes. Others do likewise with pen and ink. But Jack Arzonico is different. He coaxes remarkable museum-type pictures out of wood inlays and he sells them for prices ranging from $7.50 to $500 depending on the size and design.

In his well-organized basement workshop in Tenafly, N. J., Jack designs his plaques in his spare time. He uses about 450 varieties of wood of all textures and colors which come from such timber as mahogany, zebra wood, maple, walnut, lace, hollywood, white hair, purple heart, teak and faux-satine among others. The wood is culled from all over the world.

How did he get started? It all happened quite by accident. About 25 years ago while working as a materials inspector for Western Electric, he was fascinated by the timbers he had to examine on his trips to the South. As a result he began collecting pieces of rare and exotic wood. When he acquired a shed full the idea struck him that something useful ought to be made out of these beautiful specimens but he didn't know how or where to begin.

One day he picked up a French country scene painted by a noted artist and decided to try to duplicate it in wood.

Using a rounded penknife he began cutting out pieces from his stock. Carefully he glued them together and gradually they grew into an exact likeness of the painting.

Surprised by the results of his hidden talent, he tried other small pictures. The more he worked with his new hobby, the more he mastered the technique of blending the natural colored woods.

Friends saw the unique inlays and wanted them. Actually, the plaques didn't require any sales talk. They literally sold themselves. With the profit from these sales, Jack bought a power jigsaw which he learned to operate by using it frequently.

First he makes a pad of all veneers that will be needed for finished picture. Then he saws out pieces, top. These are selected for color, then glued to veneer background, upper right. This is placed in press until completely dry, above left. Then it is sanded from opposite side and mounted on plywood plaque and varnished, above right.

Then he added other power tools such as a sander, drill and saw.

By this time he discovered that if he put his varied colored veneers one on top of the other in a pad and transferred his picture to the top layer through a tracing process, he then could cut out all pieces at one time on the jigsaw. Thus, when the pieces were sorted and ready to assemble, they fell neatly into place and could be glued to a mount.

Next, he placed the inlay mount in a press which he won as a prize in a national hobby contest. After a few hours in the press, the inlay was glued to a plywood core about a half-inch thick. The work was then varnished for a smooth finish. This is the process he still uses. Small plaques cost him about $3 for material.

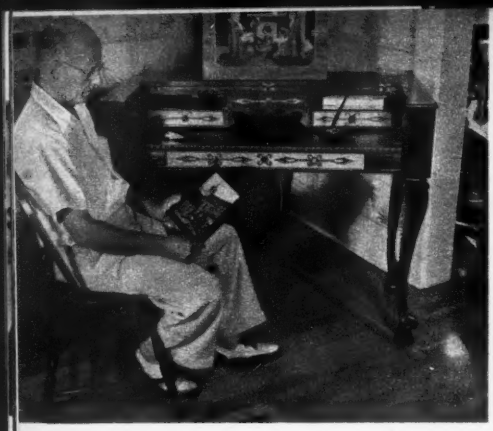
Encouraged by his sales and talent, Jack experimented with other items such as picture frames, tables, lamps, cigarette boxes and trays. It wasn't long before he was building rare pieces of furniture for his home.

Oddly enough, Jack doesn't advertise or look for customers. Word to mouth advertising sends customers flocking to his door. They bring him calendars, book jackets, paintings and photos to be duplicated in wood.

A Maine fisherman sent him a picture of a large landlocked salmon which he caught and asked Jack to duplicate it on a wall plaque. The finished work in wood looked like a live fish. Dog lovers flood Jack with orders to "paint" their pets in natural color wood plaques.

One woman wanted a family portrait consisting of ten members duplicated on an 8x10 plaque. When Jack told the customer he was a good craftsman, not a magician, she stormed out of his house.

A perfectionist, Jack will spend hours trying to create the right effect in a single piece of wood. Once, while working on a



Arzonico builds most of his furniture, all of it inlaid. He made this desk, holds his first picture, a French scene, made over 25 years ago.

His caddie picture is humorous, wins prizes wherever it is shown. Head of Christ was one of the most difficult. The eye alone took three weeks.

head of Christ, he was having difficulty in getting the proper color and expression in the eye. Finally, after three weeks of patient work and after throwing away several hundred designs, he got what he wanted.

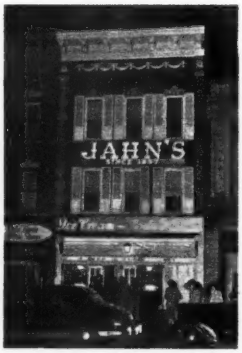
Perhaps his most ambitious and toughest project was a reproduction of the Telephone Medallion. Working solely from a photograph, Jack spent nine months designing 2,017 pieces which he cut with his penknife.

His caddy picture, which shows that his work is not entirely on the serious side, took him four months to do. He employed 30 varieties of wood and he values this beautiful picture at $300.

Where does he get his woods? Some he obtains from a mail order house in New York called Albert Constantine and Son, Inc. which specializes in veneers for the hobbiest and others he picks up from Ichabod Williams, a New York lumber dealer.

Want an artistic tea wagon, lazy susan, lamp, clock, desk, end table or what have you? Then the man to see is Jack Arzonico. If anyone can coax your item out of wood, he's the man. •

ICE CREAM HEAVEN



ARE you an ice cream lover? Then you'd like Jahn's emporium in Richmond Hill, Long Island. Their Super Duper For Two, for example, has 14 scoops of ice cream, two bananas, assorted fruits, nuts and marshmallows plus whipped cream. Price: $1.75. There are 17 other rich concoctions. Is your mouth watering? •

Step Stool is 26½ inches high, made of aluminum which can't rust. Riveted construction, easy folding, pivoted joints, rubber-cushioned feet and skidproof steps. Supports up to 800 lbs. Folds to 30½x18x5 inches. General Aluminum, Transfer, Pa.

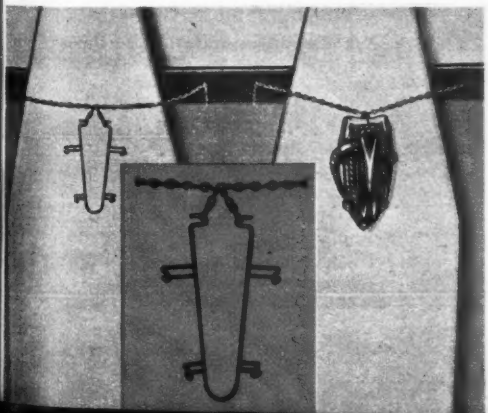
Sno-Thro is self-propelled with wheel drive, does a clean job of shoveling through snow or slush. Cuts path 17 inches wide without pushing. Throws, not blows, snow to a distance of 15 feet. Engine is Briggs and Stratton 6 S. Ariens, Brillion, Wis.

NEW for the HOME

Thermostat Timer is installed beneath furnace thermostat. Small heating unit raises temperature shutting off furnace in evening. It clicks off, starts furnace in morning. Times can be set on dial. Plug into any outlet. Temp-O-Matic, Chicago.

Holzit is a gadget your wife will like. Three-in-one unit holds ironing board against wall, keeps it from falling, provides adjustable iron holder, protects cover from scorching. Can be installed quickly with two hooks. Lafond, Minneapolis, Minn.

Teakoe presents first new method of tea brewing in 1,000 years. Comes in stainless steel or Pyrex. Former is lined with non-staining Pyrex. Fiberglas insulation holds heat. Patented stainless steel infuser controls brew. Teamakers, Chicago, Ill.



On the Trail of the Cottontail

In shotguns, an autoloader is a smart choice. Use No. 4 or 6 shot.

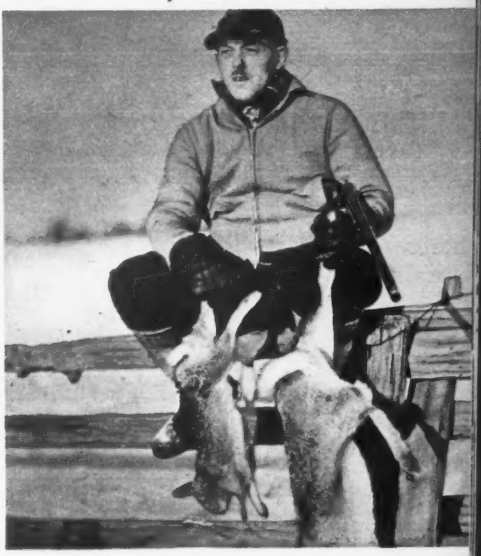
He's sport for young and old, and the more he's hunted, the more abundant he becomes. But you really need a good beagle.

By Raymond R. Camp
Rod and Gun Editor, N. Y. Times

Winter hunting, when you can follow a cottontail's footprints in snow, is fun but it can get awful cold.

It's great sport for youngsters with a .22 when dad is along to teach them the manual of arms.

Happy hunter with a pair. At left is the smaller cottontail. Right is the long-legged jack rabbit.



ACCORDING to one reliable chef, there is no such thing as a "little" garlic, and the upland-game hunter has a parallel: there is no such thing as a "few" rabbits. Either there are a lot of them or none.

The cottontail and his big cousin the varying hare have survived hunting pressure that would have wiped out any other species of game. For every hunter in this country who takes out a license, it is estimated that 90 per cent devote all or part of their time afield to hunting rabbits. The grouse population rises and falls, the exotic pheasant has periods of extreme scarcity and the waterfowl poulation waxes and wanes, but except for minor cyclic variations of a local nature, the cottontail is always present in good numbers. Furthermore, the rabbit seasons in most states stretch out for several months and in some states are never closed, so there is more than one reason for the popularity of the bunny.

No man with red corpuscles who is interested at all in hunting will deny the thrill provided by the music of a beagle in full cry behind a cottontail. If hunting indicates a reversion to the instincts of prehistoric man, then hound music stimulates it more than the pipes of Pan, for few hunters can resist the yelp of a trailing beagle.

You can hunt rabbits without the aid of a hound with reasonable success in most areas, but then, you also can ignore a bridge and swim across a river. The end result is the same, but one method is more pleasant than the other. The man who once has hunted cottontails behind a good hound, whether it happens to be a beagle, basset, redbone or just an ordinary "pot-likker dawg," usually checks on his financial situation then goes out and buys a hound, whether he can afford one or not. And this may account for the great increase in the number of hound owners during the past few years.

I don't happen to own a beagle at the moment, but I have a good friend and hunting companion who has a collection of them. His kennels might be more accurately described as a "chorus" of hounds, for he has sopranos, altos, baritones and bassos. When he puts three or four of them down in an area inhabited by rabbits, it is like a musical bedlam and it is interesting to speculate what the rabbits must think.

The day of the old-fashioned horse trader has passed, but the era of the hound dealer is only approaching its heyday. There are more forms of chicanery practiced by some of these hound breeders, most of them amateurs, than ever were dreamed of by the horse trader. I ran afoul of one of them when I obtained my last beagle.

I heard of a farmer who had some young,

Australia has its rabbits. These Melbourne hunters bagged 53 in a single night hunt with lights.

trained dogs for sale and I dropped in to see him, just to talk, not especially with the idea of taking home a dog. Somehow, a half-hour after I arrived, we were walking over his acres listening to Beller, one of his pups, making life interesting for the rabbits. It was a clay soil area and the rabbits were in burrows rather than brush, and that beagle really gave them a fast run before they escaped by seeking the sanctuary of a burrow. After a half-hour of this I was sold on the dog, and when I left I was sold the dog itself.

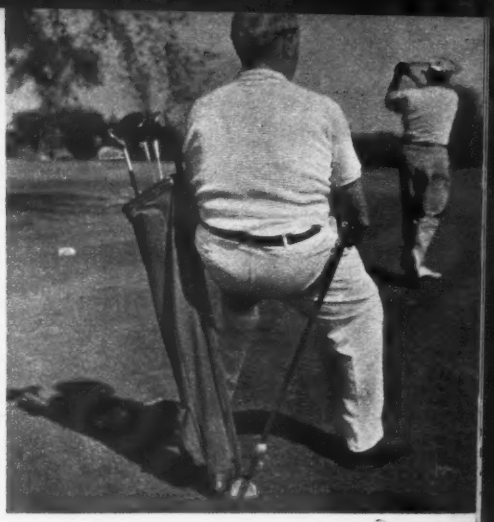
The countryside I hunted was quite different in character to Beller's home terrain, but on opening day of the cottontail season we headed for a brushy river bottom. Less than two minutes after leaving the car Beller jumped a rabbit and his yelps were a joy to hear. In another minute these yelps changed to screams of pain and frustration. Beller had made a headlong encounter with his first briar patch. Brush and weeds he did not mind, but briars were something else and he wanted no part of a rabbit that was inconsiderate enough to run in such cover. A hound that will not run through a briar patch is every bit as useful to a man as a 20-gauge gun when he has a pocket full of 12-gauge shells.

I had a long [*Continued on page* 170]

Beagles add to the success of any rabbit hunt, and the hound music is sweet to a hunter's ears.

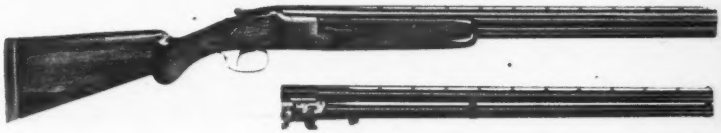
Here's the story in one photo: a tired beagle, the game and empty boots at the end of the hunt.

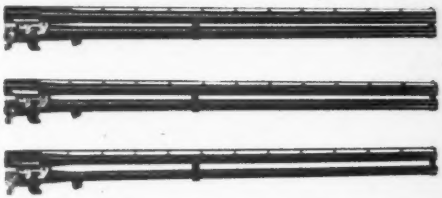
Glo-Vest is just right for an icy duck blind. It can be plugged into portable wet battery, heats up in seven minutes. Unit unzips for cleaning. Also use at winter sports. Glo-Vest, Larchmont, New York.



Sit-N-Rest golf bag has built-in seat. One leg is fastened to side of bag, other pivots out to form V with seat strap across top. Seating height is adjustable. Sit-N-Rest Golf Bag, Milwaukee, Wis.

NEW for the SPORTSMAN





Barrel Set for your Browning Superposed shotgun comes in 12, 20, 28 and .410 gauges. Each barrel has Simmons ventilated rib. Skeet choke in 26-inch lengths. Browning Arms, St. Louis.

Recoil Boot made of rubber with ventilated end pad slips over the stock of your rifle or shotgun. Comes in small, medium, large. Cuts recoil on light, large-caliber guns. Mershon, Glendale, Calif.

Wrist Compass called Airguide fits like a watch, is induction damped, jeweled and luminous. Crystal is magnifying type. Operates even when tilted greatly off level. Fee and Stemwedel, Chicago.

Satan, movie star tiger, takes his singing lesson. Lookit those teeth. Ouch!

Stars of Stage, Screen and . . . Jungle

By Weldon D. Woodson

THERE'S never a dull moment at the World Jungle Compound at Thousand Oaks, 32 miles north of Hollywood, where jungle animal actors are trained. There are plenty of thrills when owners W. J. (Billy) Richards and Trader Horne put them through their paces, but the big cats are unpredictable creatures and the real drama occurs when they are called upon to perform outside of school.

Take the time when a New York insurance executive decided to celebrate his wife's birthday with a real surprise. At a swanky ranch in Palm Springs, Cal., he staged—not a party, but a three-ring circus with animals from the Compound.

All went well until after the performance when seven lionesses were being transferred from the big circular arena to their individual traveling cages. Then one, 400-

In every movie which stars jungle beasts, you can bet they come from the Compound, above. Jerry Lewis is real chummy as he smooches with a chimp in My Friend Irma Goes West, below.

Tony Vitanza, now known as Pat Anthony, studied lion training at the Compound under the GI Bill, above. You've probably seen him on the screen. Below he works out with big Bonji, the leopard.

pound Martha, wanted out. She pushed against the runway, moving it just enough so that she could crawl through. She took off across the parking lot, leaped clear over automobiles and vanished into the night.

A few minutes later she sauntered over to the kitchen, no doubt attracted by the smell of food. A waiter saw her and yelled.

That told trainer Melvin Koontz where she was and it also made the 300 guests aware of the dire situation. The motion picture people were accustomed to the unexpected and took this development in stride. As if corralling the animal were a part of the pre-arranged program, they all joined in the fun. Koontz armed some of the more intrepid guests with chairs and they formed an aisle. Down this he coaxed Martha and she slowly walked ahead of him to her cage. It was no hokum when the society editor ended his piece, "And an exciting time was had by all."

Once a man bought a lioness from the Compound but couldn't handle her and brought her back. Having trained her, head trainer Koontz decided to demonstrate that actually she wasn't tough. To prove it, he went into the arena with her without the usual whip, stick, chair or gun. Barely had he entered when she sprang at him. Fortunately she as yet had no fangs and he thrust his arm into her mouth and pushed her off. But she tried to bite him, taking hold of the flesh over his hip. By the time he finally struggled away from her she had torn off practically all his clothes. Nevertheless, in spite of all of this, he suffered only a few scratches.

In reflecting over these and other incidents, Richards and Horne emphasize that there is always danger even when one is handling the most thoroughly trained lions, tigers, leopards and other big cats. Although these movie animals are taught to obey their trainer's commands, they are not tamed nor are they house pets. And these motion picture stars must be authentic on the screen. They must retain their lethal teeth and claws.

For instance, in the filming of Africa

Most difficult trick to teach a cat is to walk a tight rope since the animal is very sensitive to the unstable footing. This lion does well.

Tiger, too, does it but not without protest. His trainer is Mabel Stark who claims she's the only woman on earth crazy enough to take such a job.

There's no chain on Jackie, famous roaring MGM trademark lion as he argues with trainer Melvin Koontz. Pair appear frequently in jungle movies.

Speaks, Melvin Koontz was using young lionesses. They were in the middle of the set and one was supposed to charge him. Another trainer saw to it that everything was in readiness, observing that the star was lying peacefully about 30 feet away. But suddenly she really charged, hitting the chair Koontz held. It turned in his hand from the impact, throwing her to the side and averting a bad accident for him.

Should you visit the Jungle Compound, you'll be sure to recognize some of the stars you have previously seen in the safety of a modern theater. There are about 100 members of the cat family alone. Among them are Dynamite the black panther, Bongi the leopard, Satan the tiger, Regal the lioness, Princess and Sherry the pumas, Emma and Babe the elephants, Bussa the Cheeta, Rumpy the talking camel, and Peggy, Hooligan and Poppy the chimpanzees. In practically every wild-animal picture where there is intimate action, one or more of these have appeared with their brothers and sisters.

Not seen there now is one who truly attained stellar heights, the chimpanzee Tamba, known to movie-goers as Bonzo since he starred in Bedtime for Bonzo. In March, 1951, the American Humane Association and the Los Angeles Society for the Prevention of Cruelty to Animals scheduled a premiere for this picture with Bonzo as host to 50 other animal actors, all contenders for Patsy awards, the animal kingdom's equivalent of Hollywood's Oscar. On the eve of this gala occasion, Tamba, with three other acting chimpanzees and a baby kangaroo, died when fire destroyed a Quonset hut at the Compound. They were not burned but suffocated to death when smoke filled the hut in which they were caged. For 30 minutes firemen worked over Tamba with a respirator, but failed to revive him.

Then there was Gilmore, the flying lion, named after California financier Earl B. Gilmore who some years ago sponsored speed flights by the animal's owner, Colonel Roscoe Turner. When a kitten, Gilmore accompanied Turner in his airplane flights, chalking up to his credit an estimated 50,000 miles. By the time he was four he had to give it up, not because he showed a distaste for it but his bulk would not fit in a cockpit. For 18 years he was earthbound and in December, 1950, then 22, he died of old age. Turner flew from Indianapolis for the funeral.

Best known of all, though, and as familiar to the American public as the faces of Eisenhower, Truman or Joe Di Maggio is the mug of Old [*Continued on page* 166]

hobby
HALL OF FAME

Sculptor Brown describes this head as that of a boxer with a beaten face who has just won a hard-fought decision. He also makes baseball players, nudes, romantic portraits.

Princeton's Boxing Sculptor

PRINCETON University's professor Joseph Brown is an expert in two fields that seldom overlap, the manly art of self-defense and the aesthetic art of sculpture. Brown got his knowledge of boxing the hard way, by trading punches in the professional ring in order to work himself through Temple University. Near graduation time, an established sculptor happened to see Joe, admired his physique and asked him if he'd pose. One day, Joe picked up some clay and tried his own hand at figure forming. So successful was he that his first three works were accepted for exhibit by the Pennsylvania Academy of Fine Arts.

Eventually he heard about an opening for a boxing coach at Princeton. He got the job. His statuettes impressed a Princeton dean who had Joe teach an extra course in sculpture as well as boxing. His classes are among the most popular on the campus as proved by their attendance. •

In his other job, boxer Joe supervises two freshmen who are trying to master the cross-hook.

Statue called Dropped, Antaeus 1951, is a modern version of mythical Hercules-Antaeus boxing match.

During cold days, close and lock windows to prevent air seepage. At night, cover windows with drapes to reduce heat loss.

Your Heating Dollar

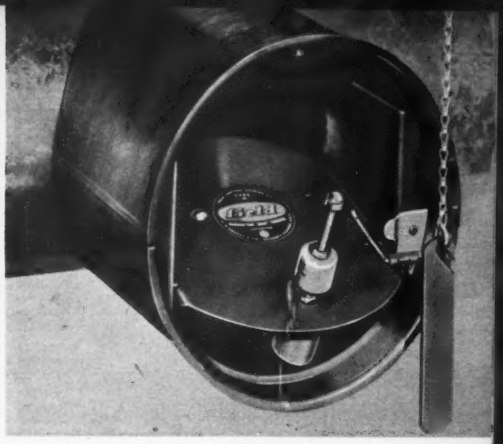
By Byron B. Courtney

ONE of the basic household bills is the fuel bill. By following a few suggestions, the homeowner can save a sizable percentage of his annual fuel costs and still keep his home at a comfortable temperature. Certainly any suggestion concerning how to help lick the high cost of living is worthy of anyone's attention.

The first thing a homeowner should do is to learn completely the operation and functions of his heating system. There should be no mysteries about any part of the heating plant because no heating system can be operated at peak efficiency unless it is completely understood by the operator.

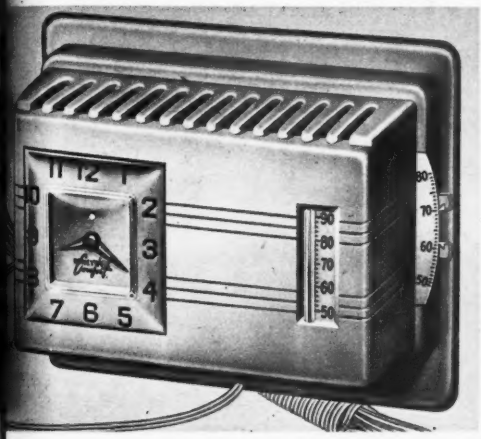
With gas or oil-fired units, the flow of fuel to the burner is usually automatic. But with coal-fired equipment, in the units fired by hand, there is a right way and a wrong way to add the fuel. The drawings illustrate the proper procedure for both soft and hard coal. Don't operate the grate-shaker handle unless absolutely

With an ordinary calking gun, any homeowner can do a fine sealing job around doors and windows.

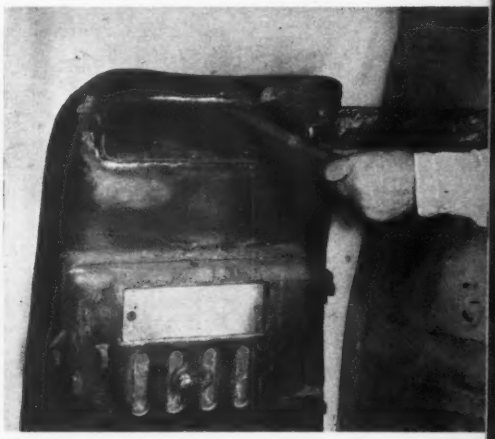


Too much draft wastes fuel. Barometric damper, above, permits proper regulation of the draft.

This fuel saver, the Chronotherm, automatically turns heat down at night, up again in morning.



You don't want insulation inside your furnace. Since soot is insulation, remove it frequently.



necessary, and then only until live coal can be seen in the ash pit. Keep the ash-pit door closed except for a short time after a new fire is built. Remember, too much draft wastes fuel and pulls heat right up the chimney.

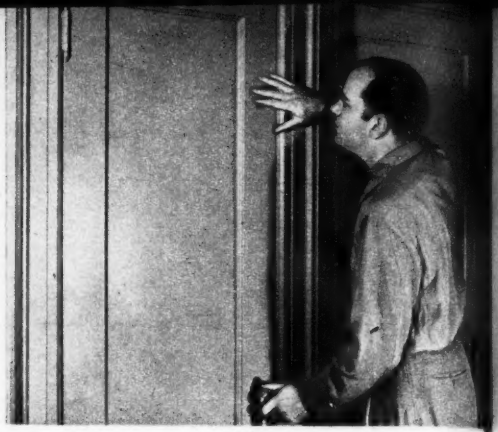
No heating system can operate as it should without a proper draft. The draft can be increased by adding to the chimney, with either masonry or a sheet-metal extension; it can be decreased by using a barometric damper. It is recommended that a qualified heating dealer be consulted when a draft problem exists.

Of course, any furnace or heating unit should be thoroughly cleaned at least once a year. All heating dealers have vacuum equipment designed especially for this type of work. With the right kind of vacuum cleaner, the homeowner can do a satisfactory job of cleaning his own furnace. About four weeks after the firing season has begun, soot will begin to form on the inner walls of the heater or boiler. One-eighth inch of this soot has about the same insulating effect as one-half inch of regular insulation material. Therefore, about three or four times during the winter season, it is a good idea to take a stiff brush and brush all this soot down into the firebox. If you pick a mild day, you can give part of the smoke pipe the same cleaning by reaching through the check draft or barometric damper. Remember, you don't want *insulation* on the *inside* of your heater!

In most warm-air heating systems, individual pipes or ducts are extended to all rooms. All of these pipes should be equipped with [*Continued on page* 158]

More photos on next page

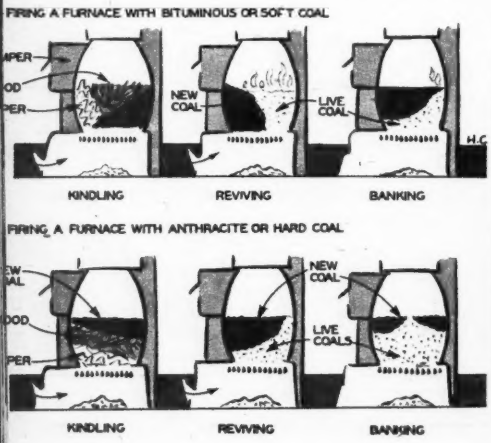
Heat loss through windows can be diminished by installation of carefully fitted storm windows.

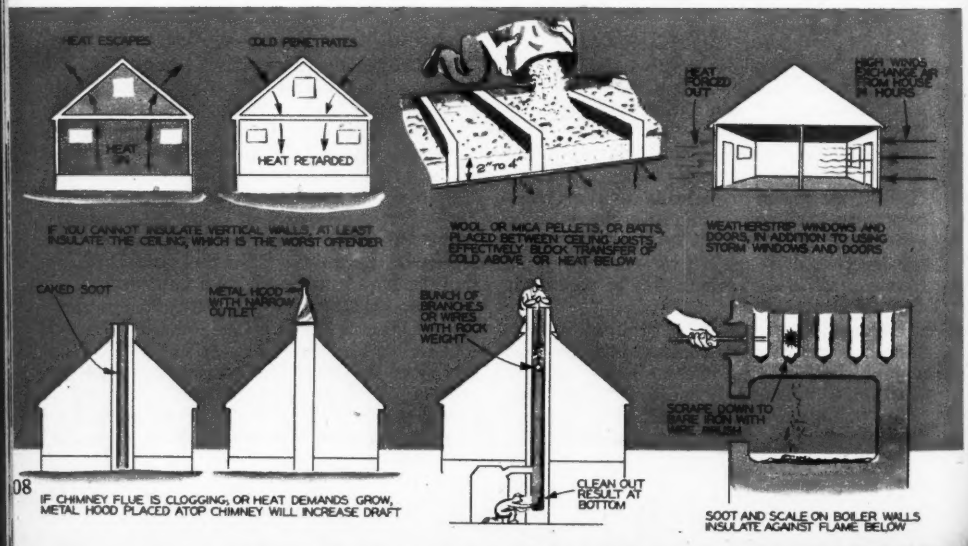


Cut down the number of cubic feet to be heated by keeping all closet and cabinet doors closed.

The drawings below depict proper procedures for firing a furnace with either soft or hard coal.

Buy the best weatherstripping. Cheap materials wear quickly and jam, cost as much in long run.

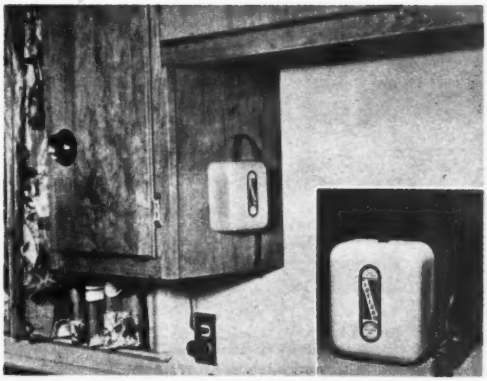




Unsightly old base boards can be readily replaced with a new flexible, all-rubber material. Scissors and a knife are the only tools required to do a first-class job. Cass Products Co., Chicago, Ill.

No nails or screws are required to use this bronze weather stripping which has adhesive backing that holds snugly to door and window frames, eliminating drafts. Kunkel Products, Akron, Ohio.

New Products for your house

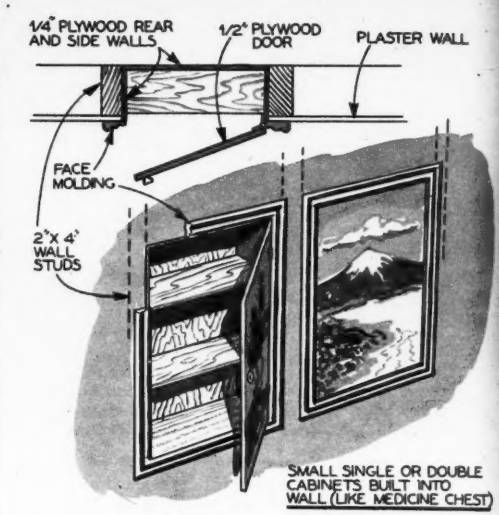


Electrically operated wall device gives a loud, penetrating fire warning when room temperature reaches danger point. Unit automatically resets itself after use. R. J. Schuler Assoc., Detroit, Mich.

Furniture refinishing kit contains everythin needed to remove and replace old, worn finishe An instruction book provides step-by-step guid for the novice. Embree Mfg. Co., Elizabeth, N.

In one minute this device digs a post hole 3 ft. deep. Works with any electric drill from ½ in. up that turns 600 rpm or less. E. J. Freeman Co., Van Nuys, Calif.

Automatically controlled gas water heater provides hot water of two different temperatures from a single rust-proof tank. Made by Ruud Mfg. Co., Pittsburgh, Pa.



Framed oil painting which appears to hang on this dining room wall actually serves as the door to a convenient china cabinet. Size of the cabinet will be dictated by your needs and wall specifications.

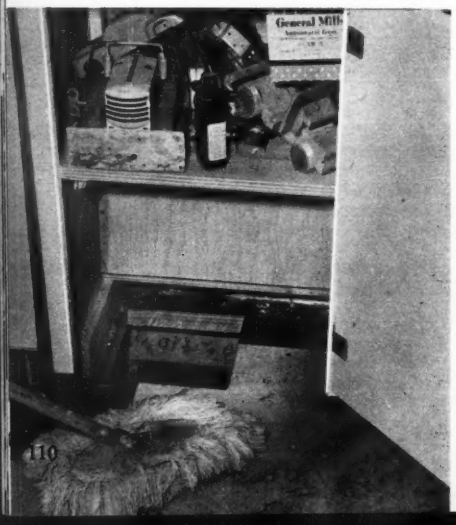
storage nooks

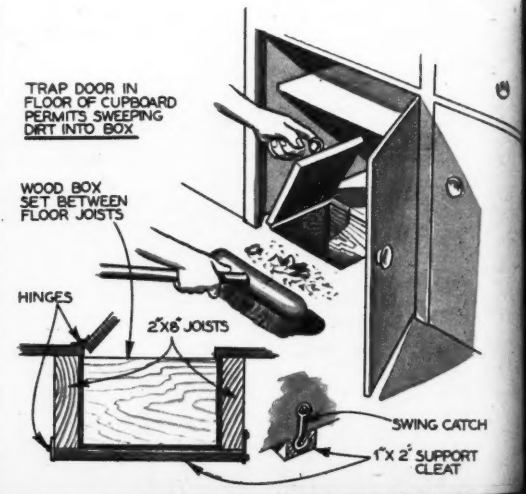
Cramped for space? Then squeeze some closets into your wall area.

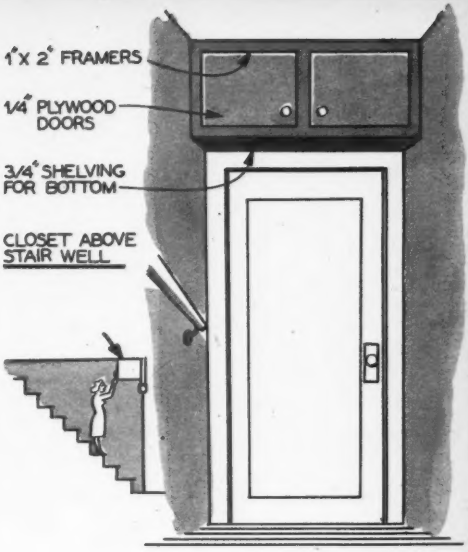
By Elma Waltner

your house

"Sweeping hole" consists of a trap door cut in the kitchen floor, below which is a box, positioned as shown, to accept kitchen sweepings. The installation shown has not required emptying for a year.







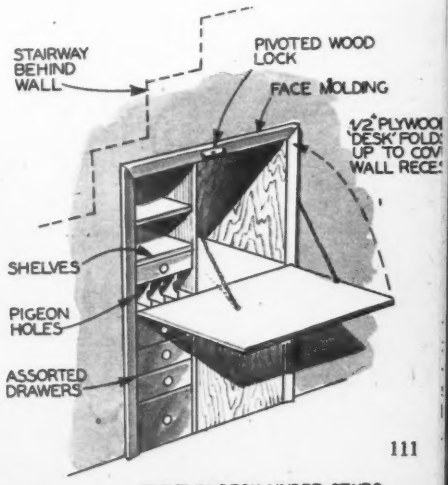
Stair well cupboard utilizes a traditionally wasted area. One of the advantages of this unit is that it can be easily reached without the assistance of a ladder. Attach cabinet to walls and ceiling.

IF you're lucky enough to live in a modern structure tailored to your own taste, you can just skip this piece. All of your storage problems have been anticipated on the blueprint—with an eye to the future for possible expansion. But if, like most of us, you occupy a home that's from 10 to 25 years old, chances are that you're pretty short on adequate space for even the most essential items.

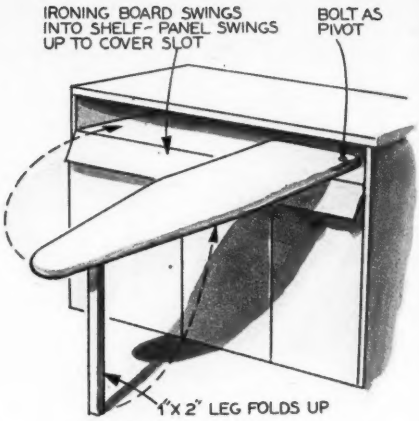
Pictured on these pages are several ingenious methods of squeezing just about every cubic inch out of your area. An unusual application is a "sweeping hole," which is cut right into a corner of the kitchen floor and dispenses forever with the dustpan. A hinged top closes over the sweeping box, which is supported by the floor joists and cleats. The top of the box is fitted with a rubber gasket to insure a dust-tight fit when the top is closed.

Cupboards built in or above a stair well

Despite all the storage space and ample writing surface embodied in the unit below, it's flush with your wall when closed. This particular desk was built under the stairs leading to the second story.



BUILT IN DESK UNDER STAIRS



BUILT-IN IRONING BOARD STOWS UNDER KITCHEN COUNTER TOP

Only a few inches under your counter top are required to incorporate a handy ironing board hideaway. However, MI does not recommend leaving a plugged-in iron unattended—even for a photographer.

offers lots of room for infrequently used objects, or for home-canned goods.

A clever ironing board unit can probably be installed in the space under your present counter top in the kitchen. When the board is tucked away, the area is closed to view by a long narrow door, as shown.

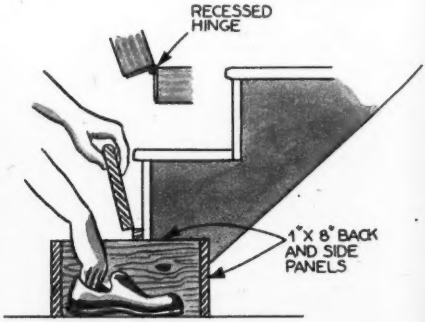
What housewife wouldn't like a sewing cabinet right by her machine? Notice the roomy built-in depicted at the bottom of this page, which will easily hold all sewing supplies and machine accessories.

Some of these projects involve cutting through your present wall, but this isn't as tough as it sounds. By pounding your fist along your wall, you'll be able to determine where the studs are located, and at what intervals they are spaced—usually on 16-in. centers, or within an inch or two of this figure.

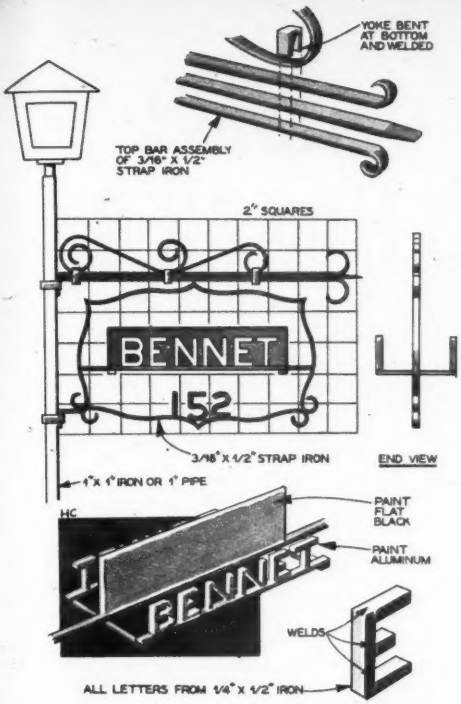
Once you've established the spacing, you can start removing the inner wall—providing, of course, that it's a workable material like wallboard or rigid insulation board. If you have a plaster wall, you'll have to cut through the laths. Start by boring a hole just inside one of the studs, then saw out as large a recess as you will require with a keyhole saw, working toward the next stud. •

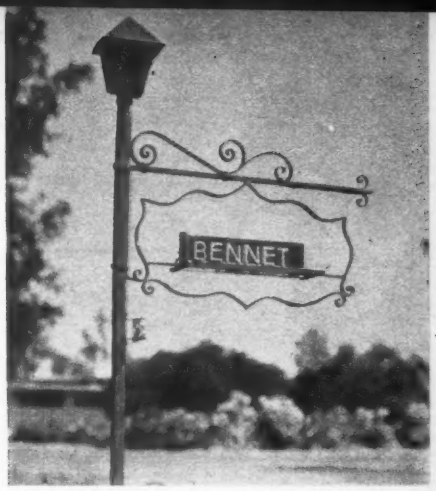
Thread, buttons, patterns, and other sewing equipment will always be on hand if the housewife is lucky enough to have a built-in needlework cabinet.

The bottom step of any staircase can be forced into service by hinging it as shown below. It makes a fine compartment for bootblack supplies.



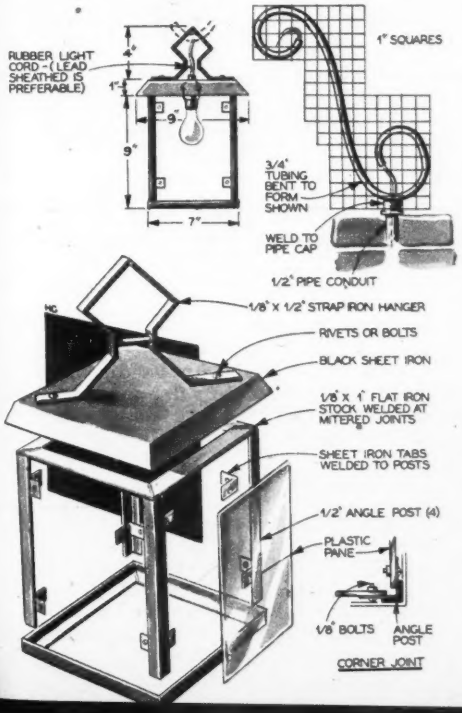
BOTTOM TREAD OF ANY STAIR FLIGHT CAN BE HINGED AS COVER FOR BOOT STORING BIN





Frame your name. At night, when the lamp is on, the letters in this sign stand out in bold relief. They are formed from ¼x½-in. flatbar with welded joints. Finish them with aluminum paint and mount them on a horizontal frame as shown. To provide contrast, apply black paint to the backing plate. The ornamental filigree is made up of $\frac{3}{16}$x½-in. strips. Bend them to shape and weld them in position. •

WE LIVE HERE

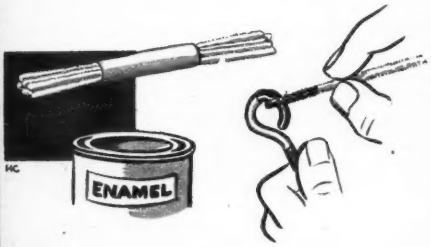


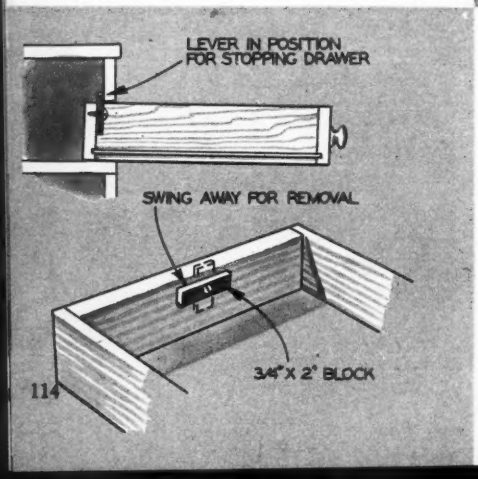
Driveway lantern. This lamp is set at right angles to the sign. The design is appropriate for the entrance to your driveway. The lantern can be hung from a wooden post or a concrete pillar. Make the lamp frame from angle bar, welding the joints. Screw the plastic panes in position. Paint all iron work black.—*Hi Sibley* •

HOME HANDIES

Tighten loose chair rungs by cutting a slot in the end of each rung, inserting a short wedge as shown in the photograph at left, applying some glue, and driving the rung back into the chair. The wedge will tighten the rung by spreading out its end.

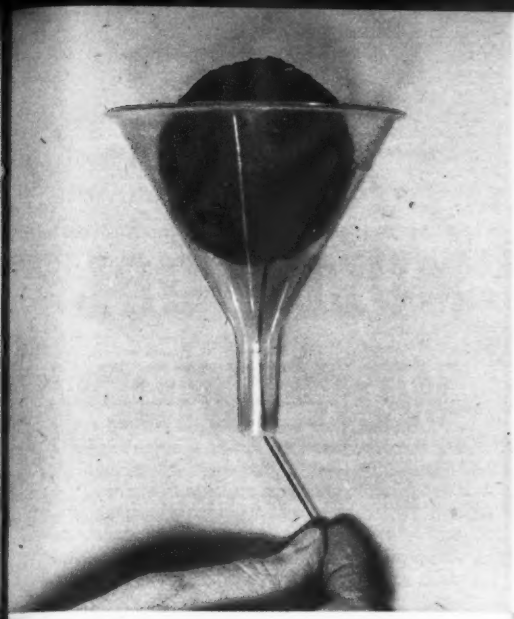
Tiny paint jobs can be done quickly and efficiently with pipe cleaners (see sketch below). Keep a package or two of them on the paint shelf. They cost so little that you will have no qualms about throwing them away after they have served their purpose.

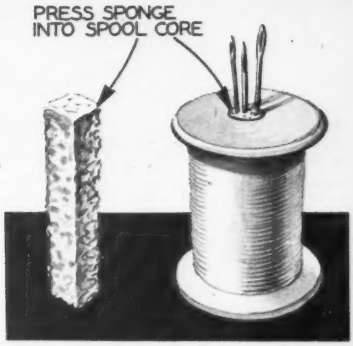




Scratch remover for plastic watch crystals. A bit of cigarette ash rubbed into a scratched crystal with the tip of your finger, as illustrated in the above photograph, will quickly and easily remove all vestiges of the disfiguring scratches.

Safety catch, left, prevents drawer from being pulled too far out. It is simply a ¾x2-in. piece of wood that pivots on a screw which is driven into the back of the drawer. If you want to remove the drawer, twist the catch until it lies horizontally.

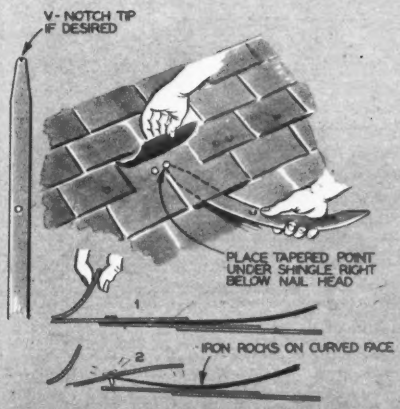




Store your needles with your thread between sewing chores. Cut a small strip from a cellulose sponge and, as illustrated in the above sketch, press it into the core of the spool on which the thread is wound; then push all the needles into the sponge.

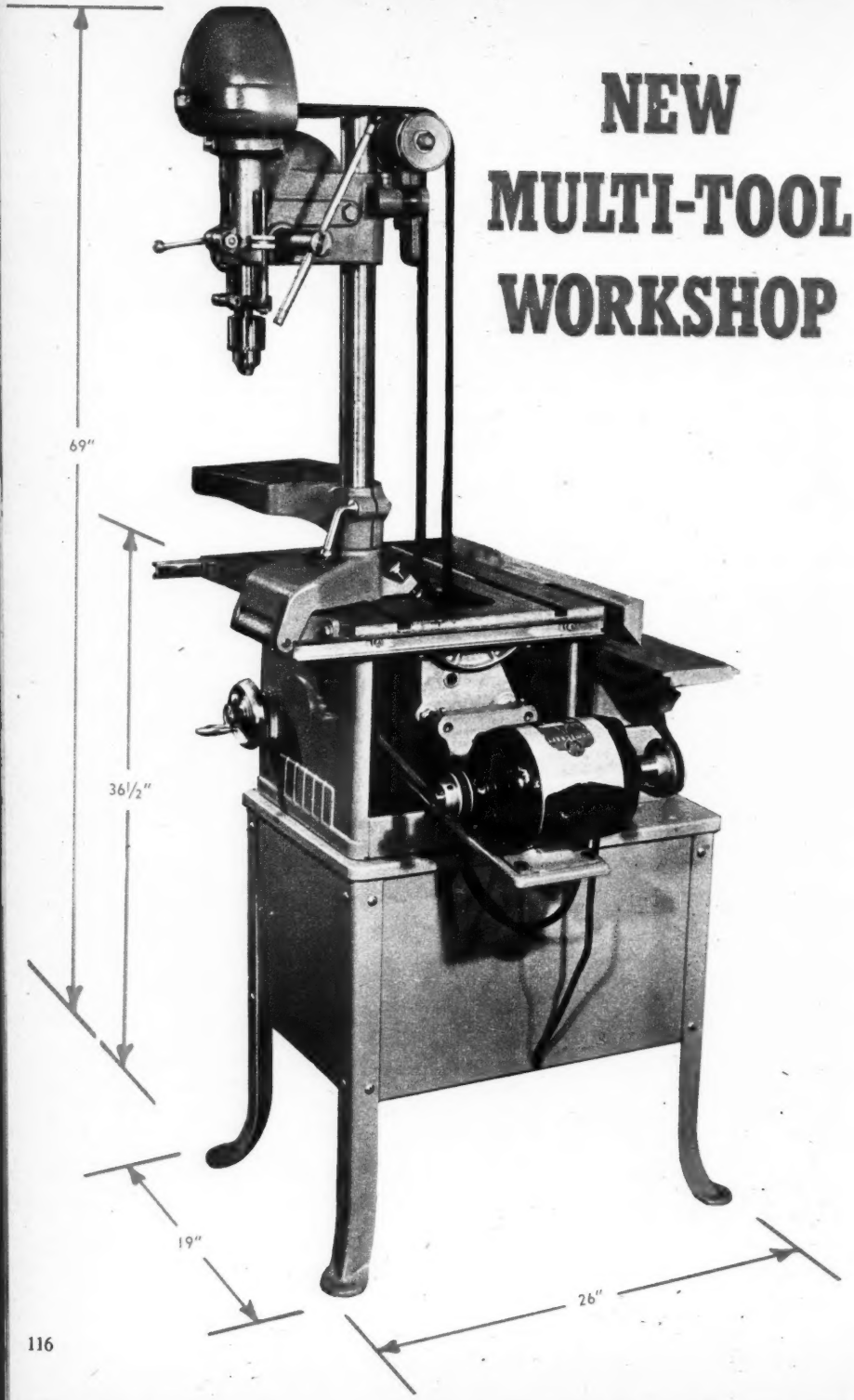
Cord keeper, above, is a plastic or metal funnel hung on the inside of a cabinet or closet door. Twine held thusly cannot get lost in the back of a drawer or cabinet. And there's no fumbling for the end of the string—it hangs from the spout as shown.

If you yearn for privacy, coat your screens with aluminum or white paint that's been thinned with turpentine. You can see out through screens treated in this way as well as you ever could, but people a few feet away on the outside can't see in.



Removing roof shingles. When replacing damaged shingles, employ the short leaf from an old spring to get at the galvanized shingle nails. Its curved profile provides sufficient leverage to pry out even the most stubborn galvanized nail.

NEW MULTI-TOOL WORKSHOP



Combining the four most often used power tools, the Deltashop lets you saw, sand, joint and drill from one stand, one motor.

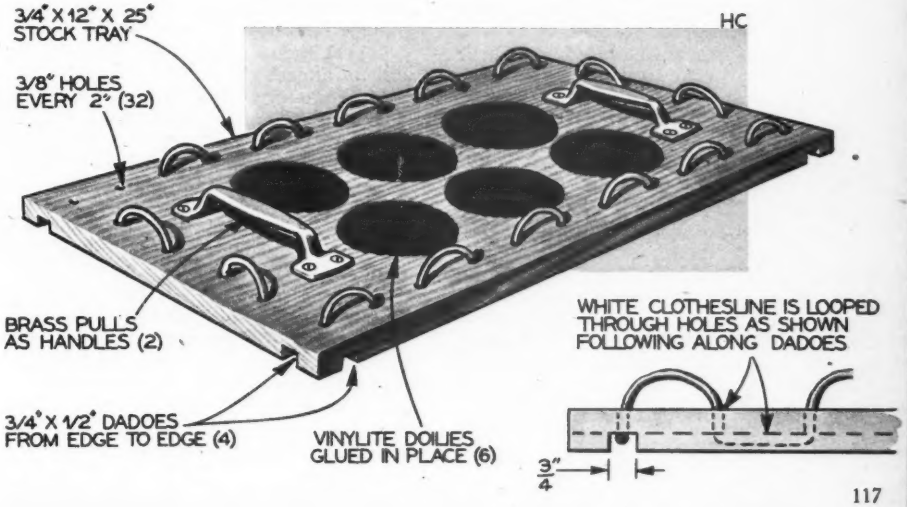
By William L. Parker

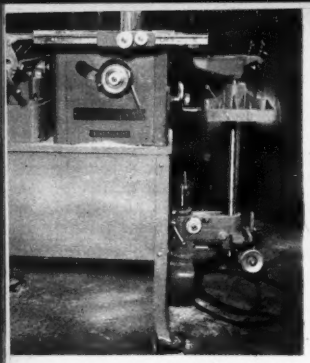
A simple cocktail tray like this can be built quickly using Deltashop's circular saw, drill press, jointer and sander. (See photos on next two pages, drawing below.)

THE guy around the house who doesn't have the space right now for a big workshop but who has large hopes for future expansion is pretty sure to be interested in the new Deltashop, one of the most ingenious multi-tool combinations ever to come along.

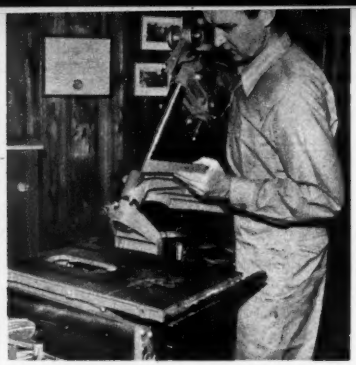
At least to my way of thinking, the most attractive feature of this saw-jointer-sander-drill press combo is this: each of these items is a standard Delta power tool and therefore can be detached from the others and set up on its own stand, with its own motor, whenever the owner wants to do so. And until that frabjus day arrives when he acquires the room to spread out, he has a compact, one-motor workshop which tucks into a space no larger than that taken up by the average refrigerator and efficiently handles almost all the jobs he wants to do around the house.

Deltashop was designed by the Rockwell Manufacturing Company, a trailblazer in the development of home workshop power tools. The company is





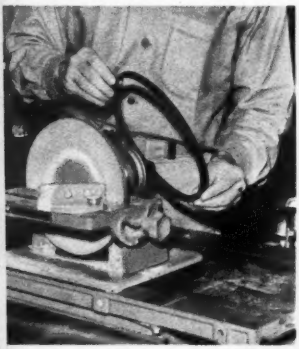
Compactness of the Deltashop is evident here. The maximum space it occupies is 38 inches square.



After removing the table saw insert, replace saw blade with pulley and swing drill press up.

Safety lock hooked over edge of saw table opening makes sure the drill press stays safely upright.

Belt is slipped over the pulleys and is tightened by adjusting the arbor, same as with drill press.



Using the miter gauge, a useful extra accessory, extremely fine and accurate sanding is possible.

Chuck mounted on the spindle lets you do horizontal drilling, grinding, brushing, buffing of all kinds.

aiming its sights not so much at the hobbyist as at the homeowner who wants to build his own screens and storm windows, kitchen cabinets and bookshelves, garden furniture and the like, as well as to make such major improvements to his house as finishing off an attic or adding another room. According to Rockwell, the Deltashop can perform about 98 per cent of the operations normally performed in a full-scale home workshop. I daresay it can.

Heart of the Deltashop is the regular Delta 8-inch tilting arbor saw, a fine tool which can cut to a depth of 2¼ inches and has a maximum rip capacity of $24\frac{5}{16}$ inches and a maximum cross cut capacity of 21¾. With this saw, of course, you can handle every basic sawing operation from the simplest to the most difficult. By using a moulding head attachment you can cut literally hundreds of different shapes of moulding, an item which can cost plenty when you buy it at the local lumber yard.

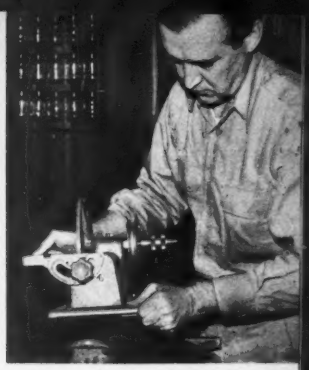
After making the saw cut you can swing directly to the 4-inch jointer, which cuts rabbets ¼-inch deep and has a 20-inch fence which tilts 45° right or left. Since the jointer and the saw operate simultaneously, you can make sawing and jointing —the business of giving even the roughest edge a glass-like smoothness—practically a single operation.

The 11-inch drill press, a versatile tool, will do almost everything from drilling a round hole—or even a square one, with the aid of a mortiser—in wood, metal or plastic, to stirring paint. On the Deltashop it hangs head-down beside the stand when not in use. In less than a minute you can have it set up and working. Naturally, you cannot use the circular saw and the drill press simultaneously but the changeover is simple and quick.

Changing from the circular saw to the disk sander, fourth of the Deltashop's tools, is even more rapid. The sander fits snugly into the saw table cut-out, directly over the arbor, so a short-length belt is all that is needed to connect the two pulleys. This disk sander is 8½ inches in diameter and has a tilting table which is slotted to

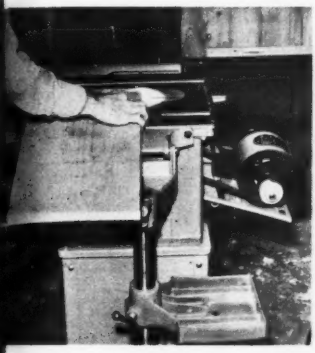
After the belt is in place, you adjust it to the proper tension by raising or lowering the arbor.

Swing the table into place, put a drill in the chuck and you're in business. Time: one minute.

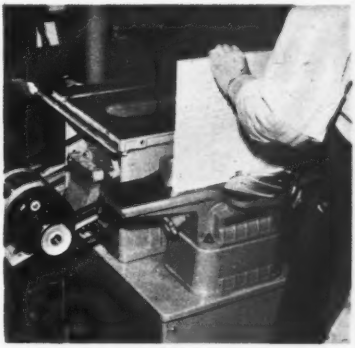


Putting the 8½-inch disk sander into operation takes only about 30 seconds and is easily done.

First step in making the tray on page 117 is to cut the lumber to proper length on the 8-inch saw.



Since the 4-inch jointer works in conjunction with the saw, giving the tray a smooth edge is easy.

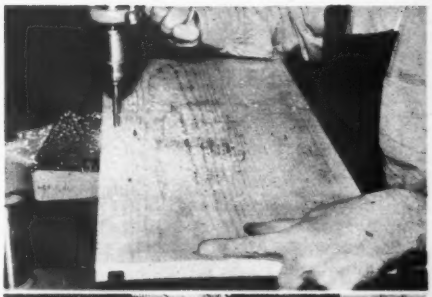


Using the dado cutters in place of the saw blade, cut four grooves on underside of tray to hide rope trim.

take a miter gauge, an accessory. The spindle at the other side of the sander has a chuck into which you can fit grinding or buffing wheels, wire or fiber brushes, or bits for horizontal drilling. You can put a lambswool buffer into the chuck, if you want to, and shine your shoes with it. Or buff the family silver.

Although it is small, measuring no more than 38 inches front to rear or left to right, the Deltashop is a bit too heavy to jack around very much unless you mount it on casters. I understand that Delta is designing its own casters especially for the Deltashop and will have them on the market before long. They will increase the versatility of this tool even more.

Complete with a steel stand and a ¾-hp motor, the Deltashop lists at $258.80. With a ½-hp motor, the price is $252.25. If purchased without a motor, it costs $209.95. •



With the drill press back in place again it is a simple matter to bore 32 holes for the rope trim which is knotted at the end and looped through. Glue veneer strips around edge to hide dado cuts.

The finished combination table. The two playing surfaces for Ping Pong are in background.

Table Tennis Railroad Pike

The problem of what to do with those Christmas trains is neatly solved with this ingenious table.

By Robert Brightman

LIKE to play Ping Pong? And your son likes to play with model trains? And you have no room for both set-ups? Here is the answer. A combination table that offers plenty of room for a model railroad pike and which can be converted in less than a minute into a very fine, standard size Ping Pong table. All the parts you will need, exclusive of the railroad equipment, are indicated in the list at the end of this article.

Start in with the large ¾-in., 5x9-ft. plywood panel which is used for the base. Mount it temporarily on a set of horses or by means of a chair at each corner. You can make your own legs or purchase a set of folding steel legs. A set of four are available for about $8 from the Diamond Mfg. Co. in Schenectady, New York. You will need two sets, eight legs. The base will be cut in half, so mark it down the center so that each section measures 4½x5-ft. At about 1½-in. from each corner mount one steel leg. Use No. 10, ¾-in. roundhead wood screws. When you have mounted the four legs have someone help you up-end the table so that it is now resting on the eight legs which you have screwed in place. The next step is to cut it down the center. Of course, if you do not have portability in mind, and you do not intend ever moving, you need not cut the table. But if you do decide to cut it, clamp a length of wood parallel and at a distance equal to the space between the blade of your portable circular saw and

Photos by Kenneth Brightman

its guide. Once this distance has been established, secure the clamps and cut the board by using the length of wood as a sort of fence. This technique is very plainly illustrated in the photo.

The next step is to rip the 4x6 sheet of ¾-in. plywood into eight pieces of equal width. Allowing for the saw cut, each one should measure about 5¾-in. wide. These eight pieces form the sides of the table. Note that two of the pieces are cut off at a 45° angle as indicated in the drawing. The two small pieces of plywood which are used to support the Masonite control panel are cut from the waste stock. You will find that you'll get a better looking table if the sides are cut so that they meet the table bottom and the ends with a ¼-in. margin instead of a straight butt joint.

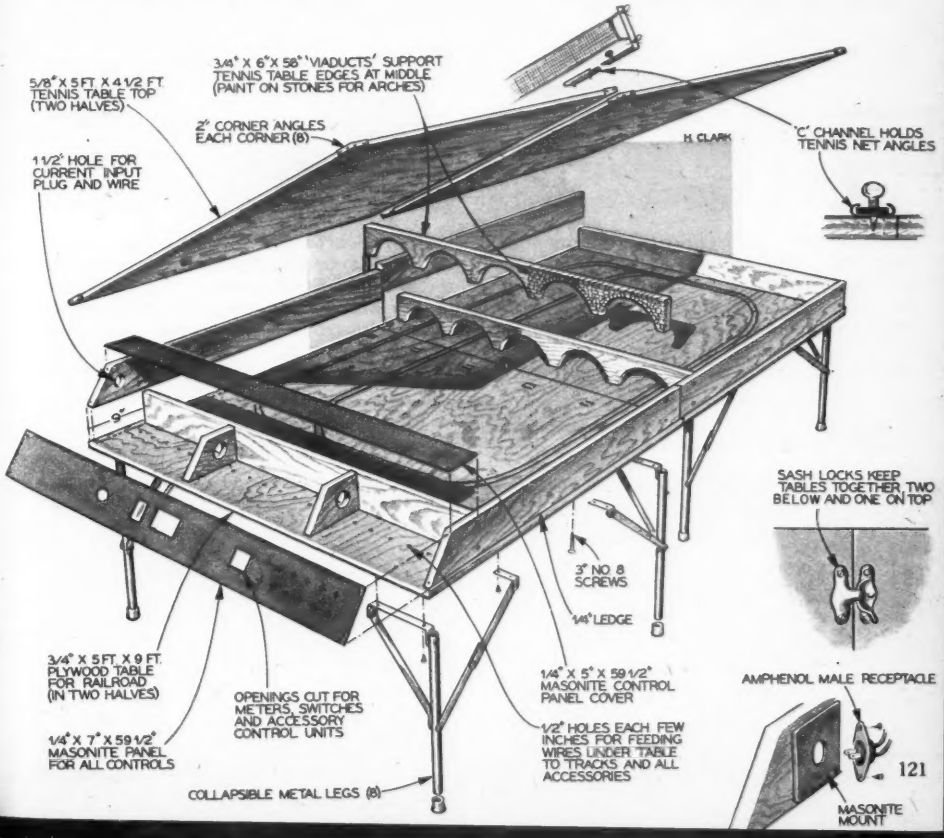
The two pieces of plywood for the central support of the table are cut with a band saw as shown in the photo. Note how a ten-inch phonograph record is used as a template for the curves.

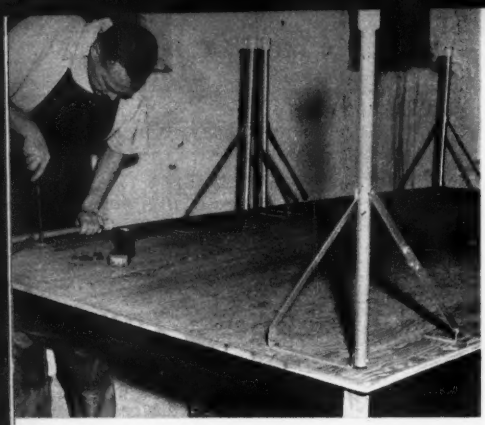
When you've gotten this far, the next step is to screw all the sides to the edges of the bottom table. Use No. 8 flathead wood screws which should be at least 3-in. long. Countersink all the holes with a rose

One minute is all you'll need to convert the railroad into a fast playing Ping Pong table.

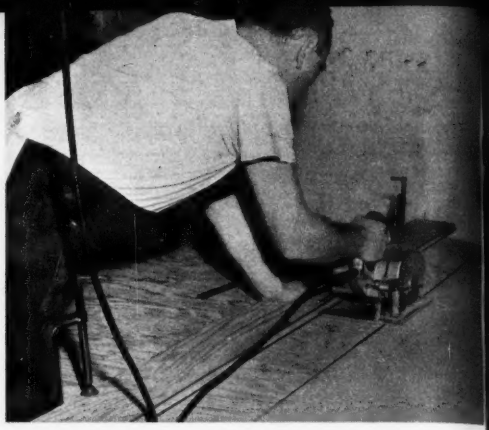
drill. Inasmuch as you will be going into end grain you should use a screw at least every eight inches. This is a rather tedious job and you'll find that things will go a good deal faster if you'll drive the screws by means of a screwdriver bit mounted in a carpenter's brace. A bit of soap on the screw will also help.

The next step is to mount the central





The first step is to mount the eight steel folding legs to the bottom of the ¾-in. panel.



Up-end the table on its legs and cut it down the middle using a board to guide the saw.

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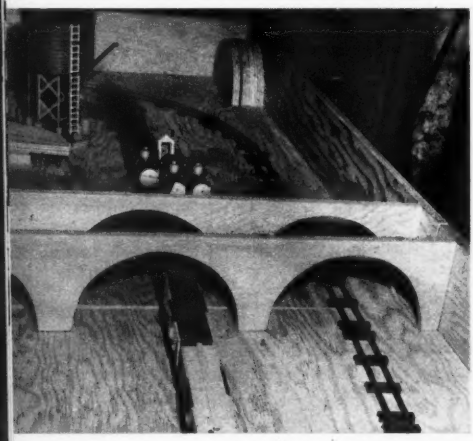
After installing center sections, tracks are installed temporarily to check for clearance.



Installing the back support for the control panel section. Use 3-in. flathead wood screws.

Hole
Bott

two diagonal supports for the sloping control panel. Drill a series of half-inch holes in the bottom of the control panel section as well as a two-inch hole in the middle of each diagonal support in order to pass the necessary wires for connecting to the switches and accessories. At this point it's a good idea to do the preliminary wiring before the sloping Masonite panel is fastened in place. Of course, what you mount on the panel depends a good deal upon the number of train accessories you are planning to control.

Note that a separate transformer is used

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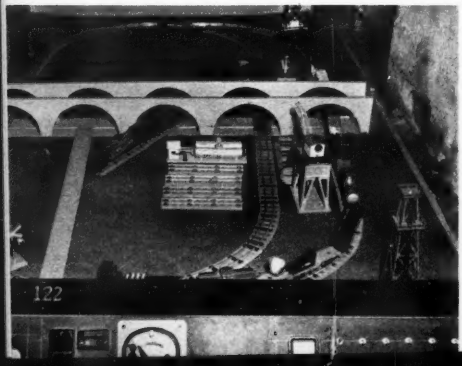
Note construction lines on control panel. Hole at left is for ammeter. Voltmeter is at right.



View of finished pike from rear. A road bed was ultimately installed on top of the trestle.

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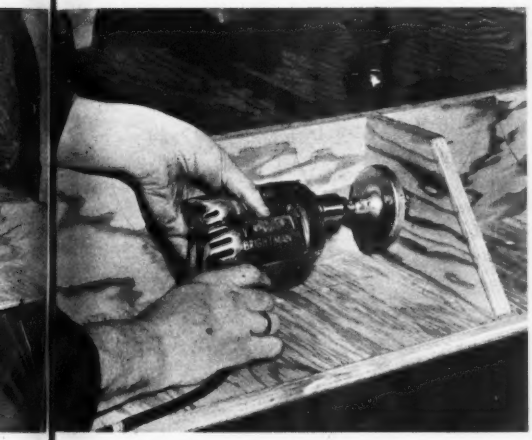
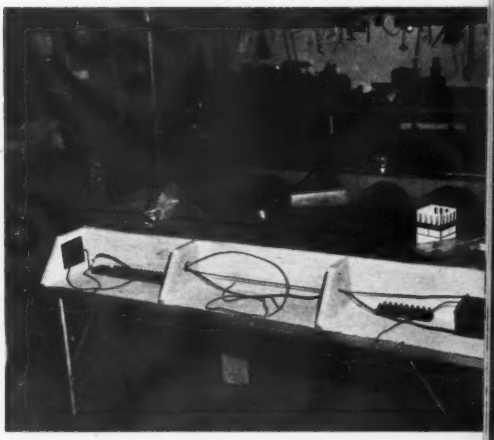
A 10-inch record is used as template for marking curves to be cut out of center sections.

Cutting the openings for the trestle support on a band saw. Openings just clear saw post.

Hole saw is used to cut passageways for wires. Bottom section has a series of half-inch holes.

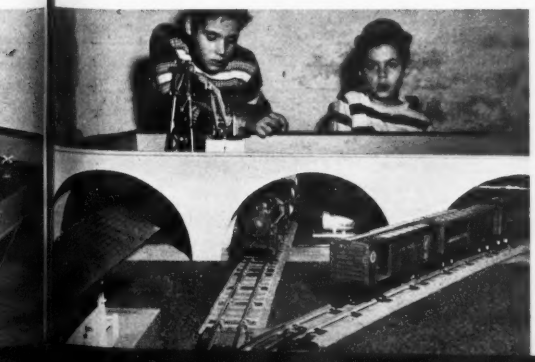


Partially wired control section. Separate transformer at far right is used for accessories.

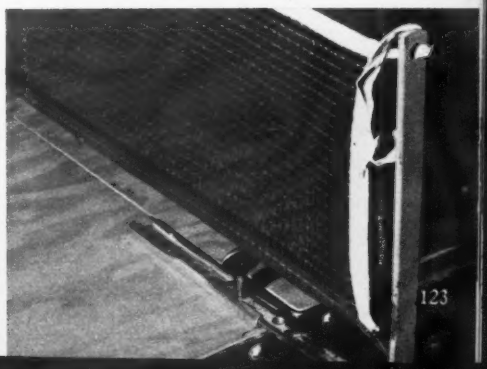


to supply current for accessories. This transformer is wired to a binding post block which in turn is wired to 24 toggle switches and four banana jacks. The banana jacks are always "live" so that a ready source of 15-volt current is available for testing purposes. Each toggle switch is wired to control something on the layout—a station, a water tower, an airplane beacon, or what have you. Not all the toggle switches are used of course, but it sure makes an impressive display. Very confusing, too, unless you know what it's all about! One toggle [*Continued on page* 154]

Small-fry engineers at control board. The rolling stock and roadbed are American Flyer equipment.



Support for net slides within a steel channel and is clamped in place with a ¼x20 wing bolt.



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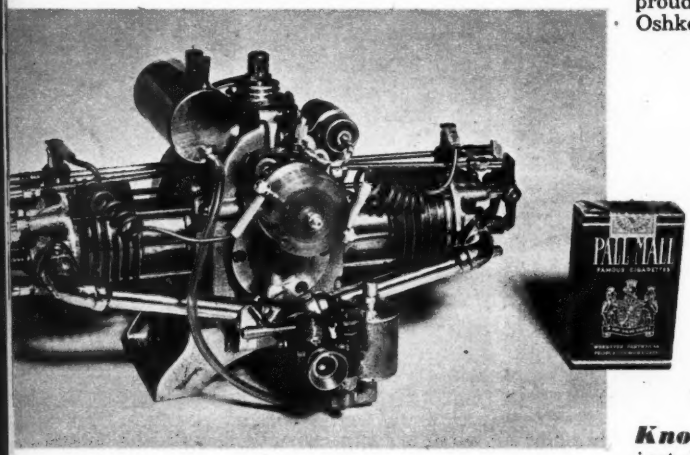
WORKBENCH AWARD WINNERS

Scale model of Canton Packet Sea Witch of 1846 required over 600 hours to build, according to proud owner Wayne Wiechering, Oshkosh, Wis., pictured above.

Tiny two-cylinder engine built by craftsman Joe Long, Ft. Lauderdale, Fla., is not much larger than a cigarette pack, turns 6,000 rpm.



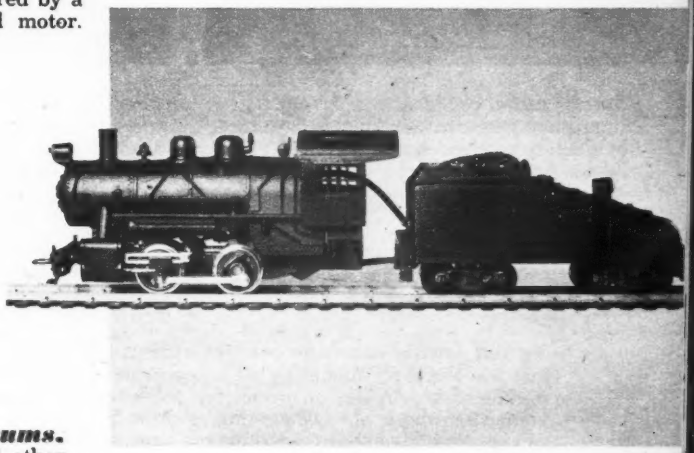
Knotty pine console cabinet built by James M. Cox, Kirksville, Ky., features radio, phonograph, tape recorder combination and is also designed for TV.

Herbert Higgins, Alexis, Ill., used parts from an auto, farm machines and washing machine to build this tractor. It has an adjustable rear wheel tread, hand clutch, worm gear steering.

Each craftsman whose project is shown here receives a $5 check and a Workbench Award Certificate. How about sending us a photo and description of your latest project? If you aren't a winner, you may still receive a Certificate Of Merit. Photographs of your workshop are also eligible for an award. Send entries to MECHANIX ILLUSTRATED Workbench Awards, 67 West 44th Street, New York 36, New York.

MI plans were used by Thomas Felasco, New Castle, Pa., in constructing this Comet 16-ft. runabout. Craft is powered by a 45-hp Lycoming inboard motor.

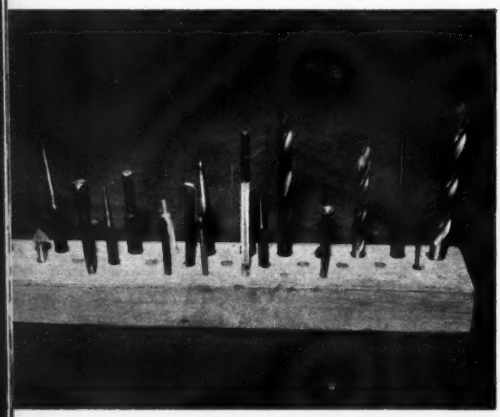
Designed for HO gauge track, this tiny locomotive is made entirely of wood except the wheels. Built by Gilbert M. Turk, Paramus, N. J., it is 8 in. long.



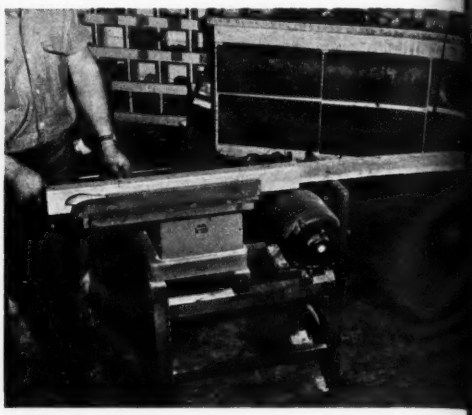
Tin cans, grease drums, a gunsight, auto parts and other odds and ends were used by Glenn N. Hyder, Newark, Ohio, to build this mammoth reflecting telescope.

Powered by a 1 1/2 hp engine equipped with a power lawn mower clutch, this car can go 23 mph. Richard Holynski and his brother, Hamburg, N. Y., built it. Car is 7 ft. long, 27 in. high.

CRAFTSMAN'S CORNER

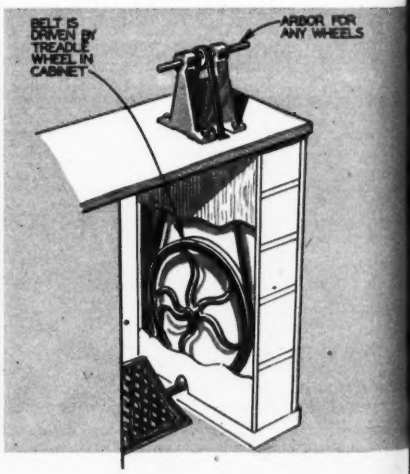


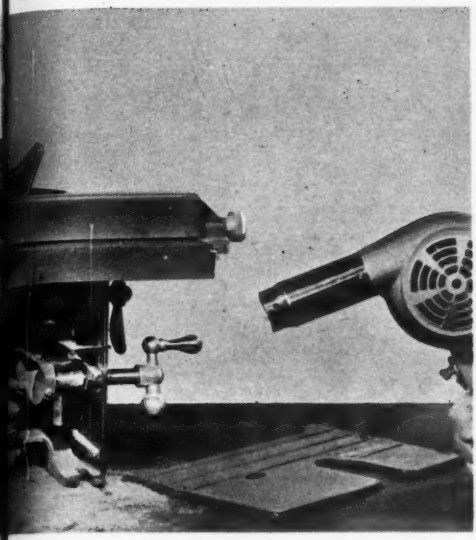
Small punches, drills, taps and other small shop gear can be conveniently stored by drilling recessed holes in a piece of 2x4. Fasten to wall or bench to avoid tipping.



Free-turning length of pipe on a rod supported by strap-steel uprights serves as a roller support that enables long boards to be moved smoothly during sawing jobs.

An old sewing machine cabinet with its foot-operated treadle makes an ideal stand for mounting an arbor in your workshop. Pumping the treadle also provides an outlet for the energy and enthusiasm of the youngster who is always wanting to show Dad what a future craftsman can do when given the chance to tackle projects on workshop equipment.



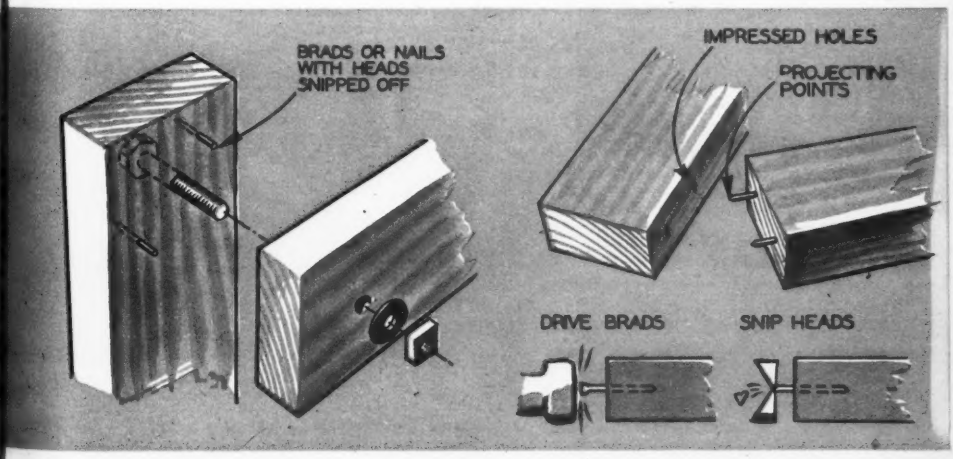


Sawdust that accumulates under the case and movable parts of a bench saw can be quickly removed by using a portable hair drying machine to blow it into a dust pan.

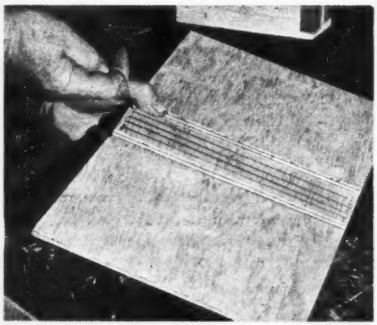
Wiping a brush on the inside of a paint can after dipping causes paint to gather in rim. Punch a few holes in rim and any overflow can drain slowly back into can.

Extra rigidity can be gained at joints held together by a bolt by simply driving two large nails half way into one piece, then cutting off heads before bolting pieces.

Pressing boards together after driving brads into one, then separating boards and removing brads leaves marks that serve as accurate markers for drilling dowel holes.



Plywood Magazine Binders

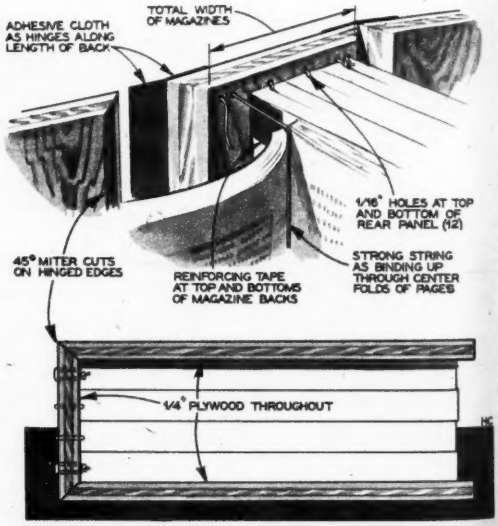


Thread cord through the holes to give four strands running lengthwise inside binder.

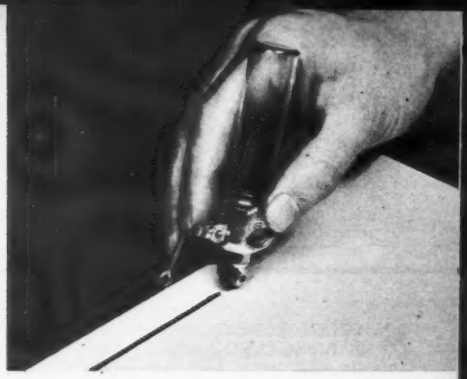
Reinforcing tape at top and bottom of each magazine keeps cord from ripping through.

Open each magazine to middle, slip all of them in place, and tighten and secure cord.

PROTECT your valuable old magazines by filing them in these efficient and attractive plywood binders. Each binder can be planned to accept any number of magazines, but four issues make a book that's a nice size. Each cover is ½ in. longer and wider than the magazines to be filed. The backpiece is a wee bit over ½ in. wider than the thicknesses of all four magazines. Cut 45° miters as shown. Use red or brown book-binding tape for hinges. Linen or nylon 36-lb. fishing line is excellent for the cords. When the magazines are bound, completely cover the spine of each binder with tape. The name and dates of the magazine can be cutouts or can be hand-lettered on paper labels or strips of white tape. Paste these on the spines. Finish the binders by coating the plywood, tape, and labels with white or orange shellac.—*Shep Shepherd* •

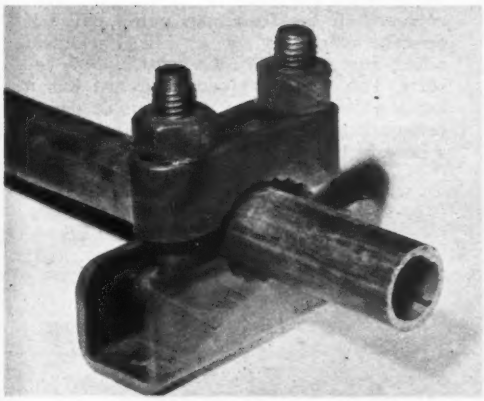


File handle is fitted with a built-in steel die to cut its own thread on tang of file, thus eliminating hazard of splitting and pulling free while in use. Safety Tool Corp., Watertown, N. Y.



Painter's striping tool has a wire guide to insure perfectly straight line when used. Glass bottle feeds an even flow of striping material to roller wheel. Wendell Mfg. Co., Chicago, Ill.

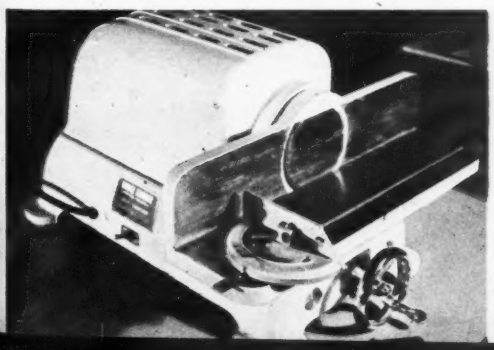
NEW for the SHOP



Readily attached to any workbench, this compact and inexpensive pipe vise will accommodate all stock up to 1 in. in diameter without slipping. Available from B. C. Moses Co., Houston, Texas.

Heavy-duty mechanic's box features a removable tote tray and a specially designed split-type cover that permits box to be closed from left or right side. Union Steel Chest Corp., LeRoy, N. Y.

The 5 in. wheel of this new grinding machine protrudes slightly through a stationary fence to provide a flat and square surface on job at hand. Southwest Machine Works, Albuquerque, N. M.



This new Carboloy masonry drill set contains four drills of 3/16, ¼, 5/16, and ⅜-in. diameter in a convenient case for easy storage or carrying. Produced by General Electric Co., Detroit, Mich.

The Blowtorch

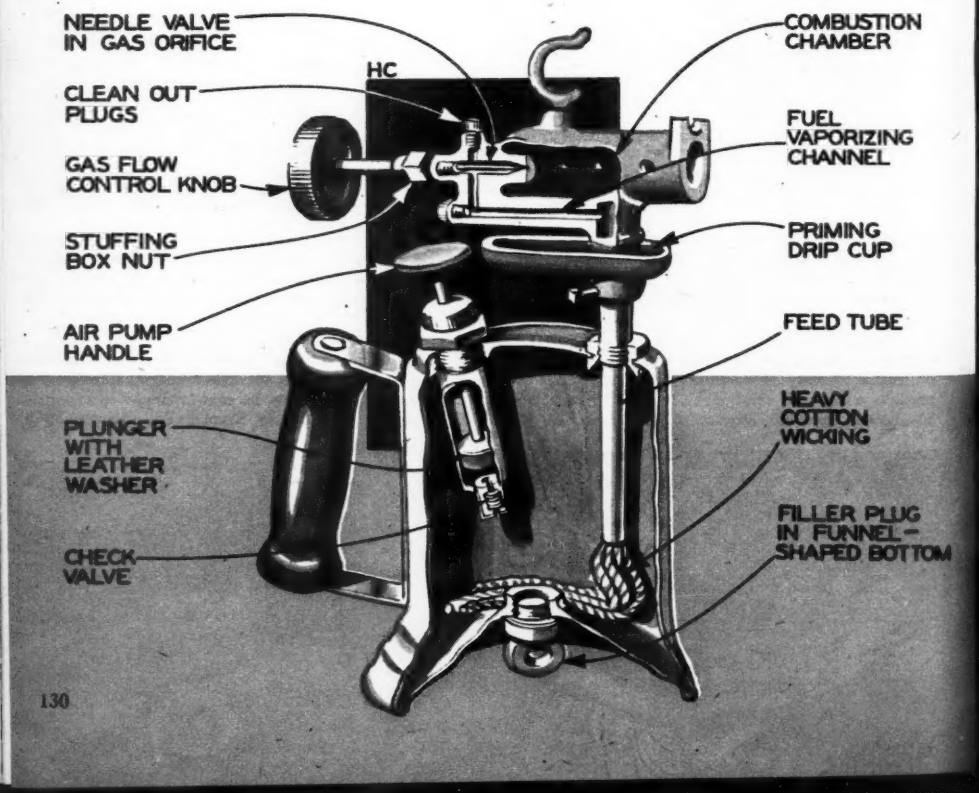
SOONER or later around your home or shop you will have need for some kind of a concentrated flame that you can control. When that time comes, one of the several kinds of gasoline, kerosene, or alcohol blowtorches (see drawings) on the market today will probably meet your requirements.

The pump-type blowtorch is the best known and probably the most widely used. They can be obtained with or without a windshield and with a single or a double jet.

While gasoline is by far the most commonly used fuel, pump-type blowtorches that burn kerosene can also be bought. The main difference between the two is in the size of the burner opening on the kerosene type, and the drip cup of the kerosene type contains an asbestos-wool stuffing.

Gasoline used for fuel in a blowtorch should be fresh and of a good grade, clean and white. It should never be an Ethyl blend, treated, high test, or lubricated fuel. Dirty gas may be filtered through a silk stocking or a piece of lint-free rayon. White gasoline is not generally used in modern automobiles but many alert service station operators keep a small supply on hand to serve their customers' special needs.

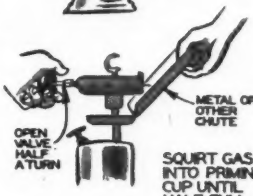
The leather washer on the pump of a new torch should first be made soft and pliable by a thorough soaking in lubricating oil. But take care, if it is wrinkled when replaced in the tube, the pump will not operate efficiently, if at all. Periodical oiling insures continued satisfactory results. The pump on some torches has a locking device to keep the plunger down, preventing pressure leakage. Others have a hole in them [*Continued on page* 169]



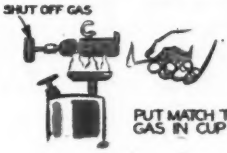
How to operate and maintain the various types and sizes that are available for home or shop.

By Clarence A. Martin

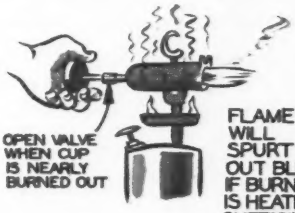
PUT ABOUT FIVE STROKES OF AIR INTO TANK WITH AIR PUMP



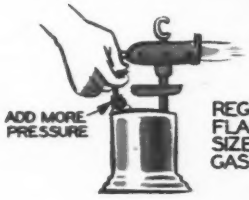
SQUIRT GAS INTO PRIMING CUP UNTIL HALF FULL



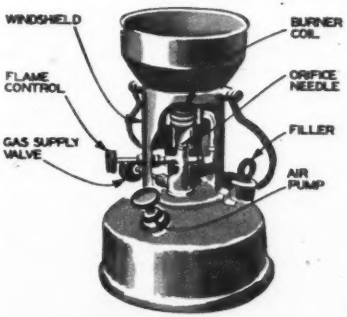
PUT MATCH TO GAS IN CUP



FLAME WILL SPURT OUT BLUE IF BURNER IS HEATED SUFFICIENTLY

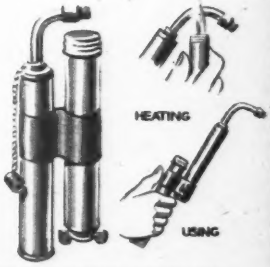


REGULATE FLAME SIZE WITH GAS VALVE



PLUMBER'S FIRE POT IS LOW PRESSURE, USED FOR MELTING LADLES OF LEAD FOR POURING

SMALL ALCOHOL TORCH HAS DOUBLE TANK AND EXTRA BURNER CYLINDER -IS SELF GENERATING



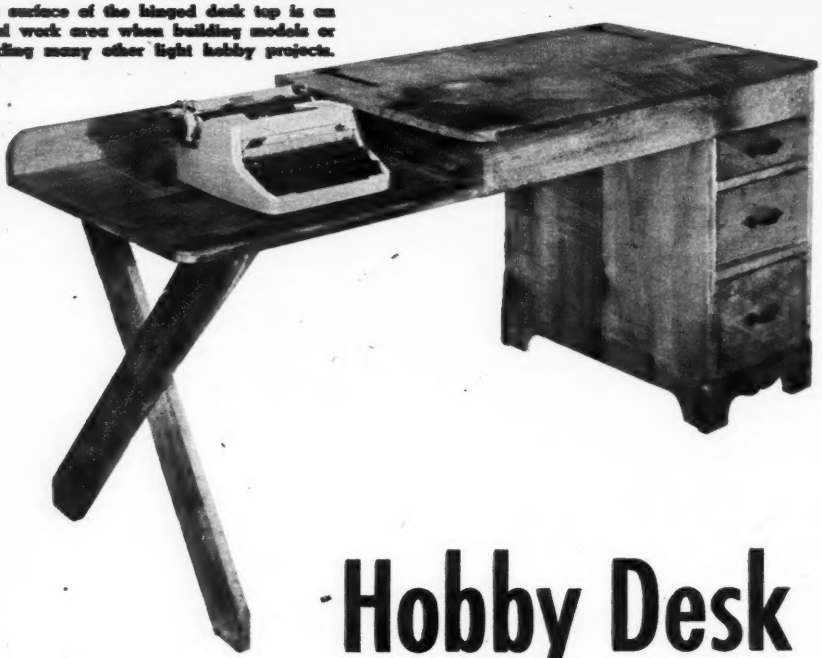
DOUBLE BARREL TORCH HAS FUEL IN ONE FOR PRIMING, AIR PRESSURE IN OTHER

LIGHT DUTY TORCH FOR GAS OR ALCOHOL, BUILDS UP OWN AIR PRESSURE

ALCOHOL TORCH FEATURES GUN GRIP FOR CONVENIENT HANDLING FROM ANY ANGLE

THESE TWO TORCHES NEED ONLY MATCH TO LIGHT TO FULL FLAME-BURNERS FOR VARIOUS SIZE FLAME EXTRA-TANKS ARE REPLACEABLE

The surface of the hinged desk top is an ideal work area when building models or tackling many other light hobby projects.



Hobby Desk

Compactness, ease of construction and ample storage space are features of this project for the hobbyist.

By Sylvester J. Zak

THE craftsman interested in model building, carving, making jewelry, etc., will appreciate the adequate storage space in this hobby desk with its roomy drawers fitted with sliding compartment trays. The desk top provides a large working area and there is also a storage well under the top in which uncompleted projects can be tucked away.

Construction details are simple and the desk can be completely assembled in about six evenings with ordinary hand tools. Total cost runs around $15.

The desk is made primarily of ¾-in. Ponderosa pine, with thinner stock being used for the drawers. In addition, wood screws, glue and some finishing nails are all that are required to assemble the desk. Follow the drawings for patterns and dimensions.

Begin construction by making the out-

Sliding compartment trays in the drawers make it easy to store small tools, glue, nails, etc.

side wall of the drawer cabinet. Place cleats flush with the top and 2 in. from the bottom. Now complete the inner wall by cleating at the bottom only. The two pieces that form each wall may be glued together or just butted, since a seam is not objectionable. Scribe the sections at the bottom of the walls that will form the legs and cut them out with a key hole saw.

The front and back sections of the base for the cabinet are made next. See drawing for the template. Fasten to the side walls with two countersunk screws on each side, front and back.

The lower level of the desk well consists of two pieces, glued or butted together. If butted, drive in a few corrugated fasteners on the bottom side. Before securing, cut off a ¾-in. inset on the front side. This will eliminate difficulty in fastening the front of the well later. Place the lower level on top of the inner cabinet wall and butt it to the outer wall. Fasten through the top and side, countersinking the side screws.

The crisscross legs should be constructed next. The correct angles and position can be determined quickly by studying the drawing. Apply glue at the intersecting points and fasten together from the inside with two finishing nails.

The connecting tie piece for the top is notched on one side to allow for leg off-set. Fasten to the legs with screws. This piece will also serve as a cleat for the lower level of the desk and hold the legs in place.

For the inside brace use ¾-in. stock and miter to a true 45° angle on each end. Before positioning the brace, the legs will have to be fastened to the lower level. The brace is then secured with a screw through the legs and through the top of the lower level, countersinking both screws.

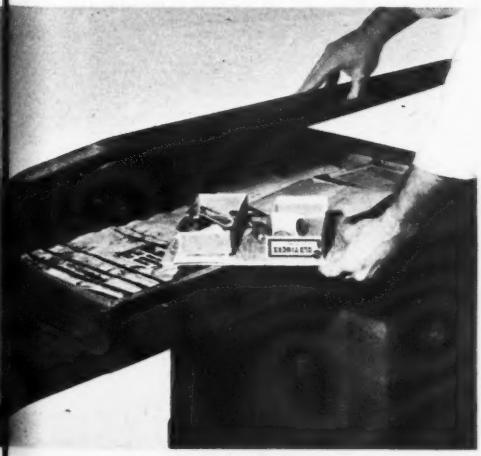
The storage well is nothing more than a rectangular frame consisting of three upright pieces, with the upper part of the outer wall of the cabinet completing the rectangle. The face piece of the well is fastened to the front of the lower level with three countersunk screws. Miter a true 45° corner at the left end of the face piece.

The back wall is one piece and runs the full length of the desk. Butt and fasten it to the outer cabinet wall and to the bottom of the lower level. The left side of the storage well is butted to the back board and mitered at the front, to correspond with the front wall miter. Pull the mitered corners together with finishing nails to make a neat joint.

The hinged top of the desk consists of three pieces. The two wide pieces are cleated with three hardwood strips, ¾x¾-in., mitered at the ends. Be sure to inset the cleats so they clear the inner dimensions of the storage compartment.

The narrow top piece is secured to the top of the back board with three countersunk screws. The top should extend 1 in. in front and on both sides, and ½-in. in the back. Hinges may be attached after sanding.

The addition of the drawers will complete the assembly. For drawer spacers use ¾x¾x21¼-in. stock for the sides and ¾x2-in. for the front. Notch the front pieces ¾x1-in. on each end and nail the side pieces to the notched sections. Position the spacers in the cabinet and

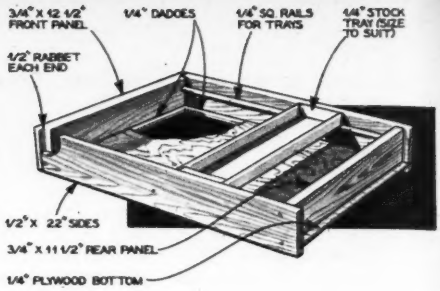


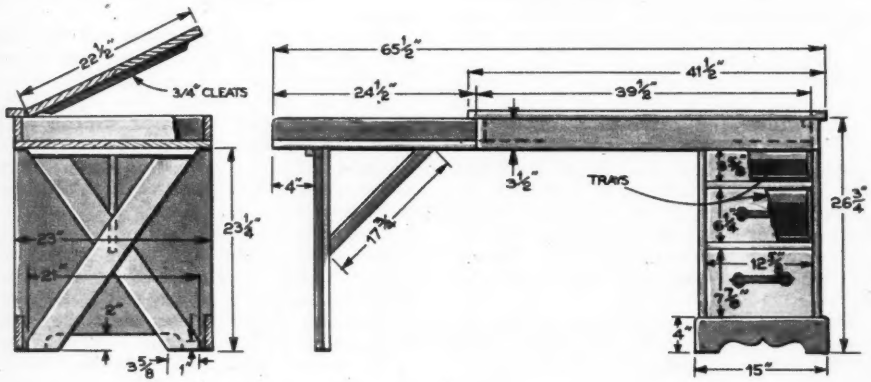
Uncompleted projects can be readily housed in the storage well under desk top until wanted.

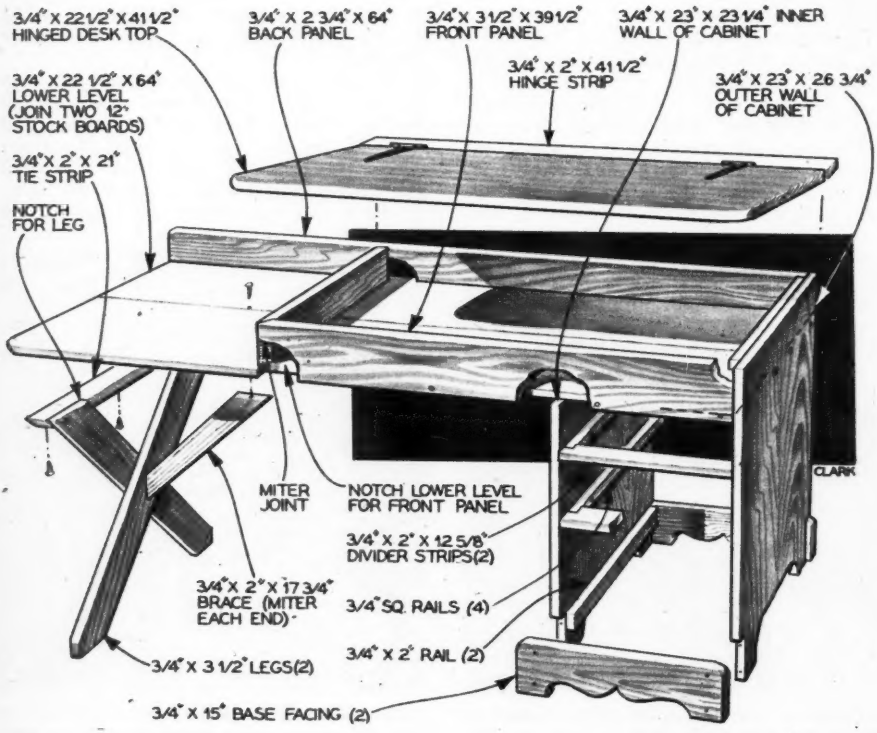
Ample drawer space means you can store not only tools and materials but hobby books as well.

fasten to the side walls with screws.

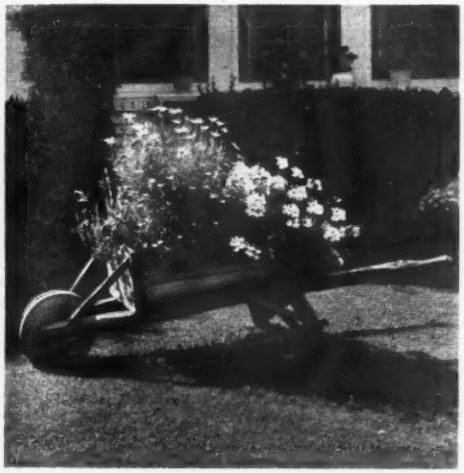
A back for the cabinet is optional and can be made from a ¼-in. plywood panel, cut to the inner dimensions of the cabinet. The drawers are made from ¾-in. stock, front and back, with ½-in. stock for the sides. Use ¼-in. plywood panels for the bottoms. The ½-in. rabbets on the drawer joints are made with a saw and chisel. Wax and buff to a fine finish. •







A Barrow For Your Blooms

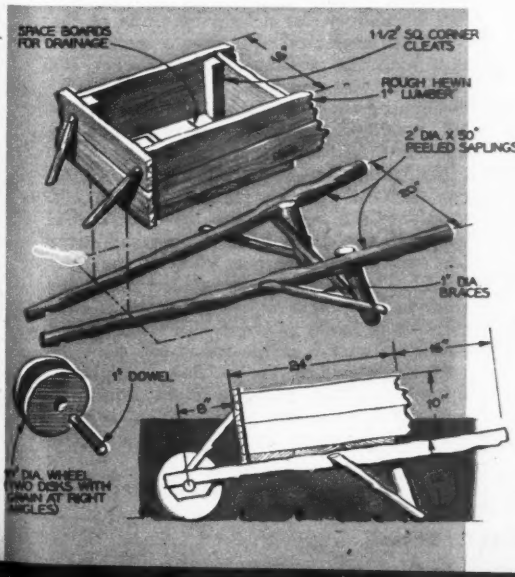


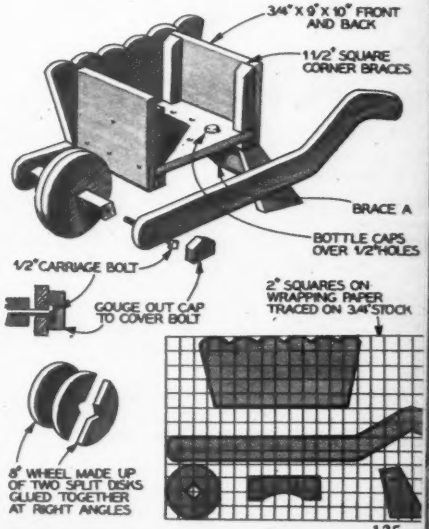
Rustic type barrow, above, appeals to many home owners but the smooth surface model, top right, bearing owner's house number is equally popular.

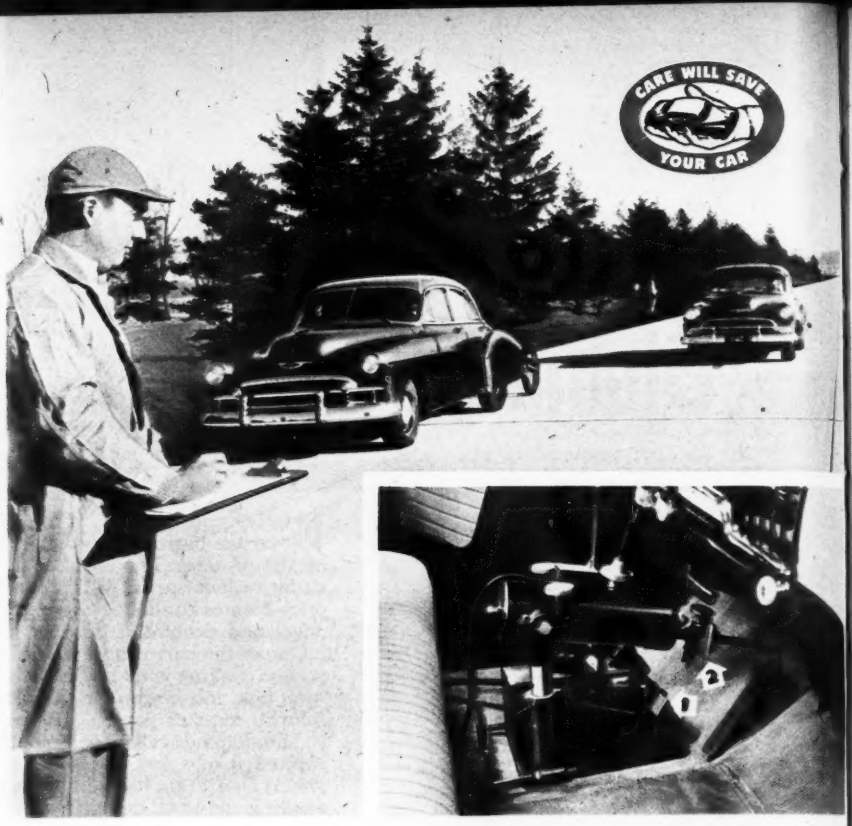
BUILD one, or both, of these attractive garden barrows this winter and you'll be the proudest home owner in the community when Spring rolls around, for your prize blooms could not be placed in a more novel and decorative setting.

One of the barrows serves a double purpose in making your house number visible from afar and brightening the lawn with a colorful mass of flowers. Its construction is simple and calls for smooth lumber, painted inside and out. Bottle caps are placed over drain holes in the bottom. The drawing shows all details for the construction of body, arms and wheel.

The other barrow is a rustic type of rough lumber with a frame of peeled and seasoned saplings. The wheel is made of two wood discs. Space the bottom boards about ¼-in. apart for drainage. Use redwood or cypress for the bottom as these woods resist decay.—*Hi Sibley* •







car care

A Line on Alignment

High speed on rough roads and abrupt engagement of the clutch will loosen the universal joints which in turn may cause front wheels to shimmy.

WHEELS out of line? Don't blame the car, it may be *you*. The car's wheels can be thrown for a loop by units of the car least suspected of having any connection with the welfare of the wheels. It's here that you and I can play a real "roll" in keeping the car to a straight line, without the high cost of regularly subjecting the car to the alignment machine.

My friend, Joe, has always been a rough guy with the clutch. He races the engine, then lets the pedal come up with a real shock to the drive line. Universal joints just won't take this sort of thing, so they wear. This looseness allows the propeller shaft to whip and makes the front wheels shimmy as badly as they would if they had excessive caster or too much toe-out.

Mazie Newrich really does the same thing with her Elegant Eight equipped with an Idealomatic transmission. Whenever she prepares to get under way she

By Frederick C. Russell

speeds up the engine and then moves the selector lever to Drive. The car does a lurch, and the universals are punished in the bargain. As far as the car's front end is concerned, she may just as well have taken a sledge hammer and knock the drag link out of line.

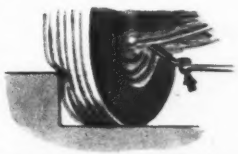
Neither Joe nor Mazie have any conception of the effect of speed on front end alignment. Somehow no one has told them the facts of motor life—how, for instance, fast driving over rough roads will bend knee action suspensions so that tires will wear prematurely. Steering will be uncertain and road shock will begin to be felt at the steering wheel. Even the experts are fooled now and again. I remember the trouble they had with a new car that shimmied despite all efforts to calm her down. They tried various deviations from factory specifications, but the new-born chariot simply did a burlesque every time it hit 30 mph.

It would be difficult to guess that this was caused by nothing more complicated than a binding rear spring shackle. When an alignment man does a job on your car one of the first steps is to make sure the chassis is free. There must be normal leveling off. No binding—and that goes for the shocks too.

This business of alignment concerns the whole car, including all four wheels. There's where tracking comes into the picture. One side of the car may actually be shorter than the other. Maybe the trouble is due to the time you hit those railroad tracks too fast. Axles can be bent by rough handling. Rear housings slip or become bent. An accident may sway the frame. "How often does the car need an alignment job?" Joe asks. Well, Joe, that depends on how well you treat that car of yours. A sudden, needless brake application puts a real strain on the car.

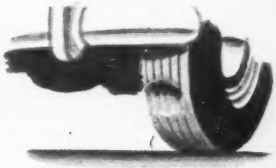
Right here a brief refresher course on alignment will serve to forestall a lot of headaches. Front wheels are gathered together at the front in order to check excessive tire wear and also to aid steering on the straightaway. This is called *toe-in*. Then we have *camber* of the wheels, represented by their outward tilt. Idea behind this is to bring the center of the tire tread as near as possible under the point of load. *Caster* is the backward tilting of the kingpins and serves to keep the wheels running straight and to ease steering. A car may

Left: Two successive models of the same car can have a difference in braking power when checked by pedal applier which exerts uniform pressure.



TURNING INTO CURBS WITH A LONG HARD SCUFF OR A JOLT, PUTS A GREAT STRAIN ON STEERING LINKS

NEGLECTED LUBRICATION OF FRONT END CAUSES EXCESS WEAR, LOOSENING UP OF ALL STEERING PARTS LEADING TO OUT OF LINE FRONT WHEELS



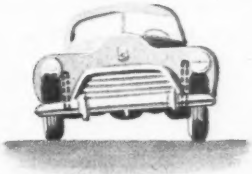
WORN SPOTS ON TIRES FROM A BAD SHIMMY OR FAULTY BRAKE LINE WILL SOON POUND A WHEEL OUT OF BALANCE, ALIGNMENT, OR BOTH

A LOOSE REAR SPRING, A, OR BENT RADIUS ROD, B, WILL MAKE YOU KEEP STEERING AT AN ANGLE

FAILURE TO SLOW DOWN WHEN GOING OVER DEEPLY RUTTED ROADS SHAKES ANY FRONT END OUT OF LINE

LOOSE OR WORN DRIVESHAFT, OR UNIVERSALS, WILL CONTRIBUTE LARGELY TO FRONT END SHIMMY

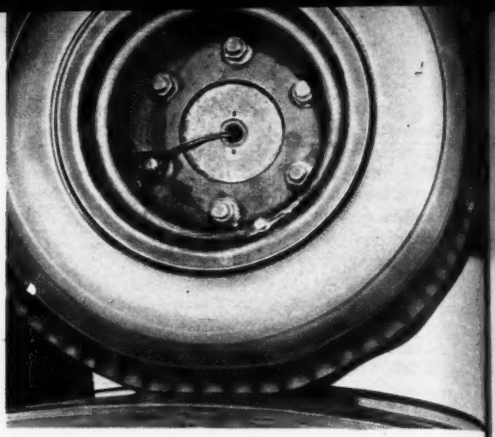
McCAHILL TURNS LINE THIS TO TEST FOR CAR'S STABILITY—YOU DO THIS OFTEN ENOUGH AND YOUR FRONT WHEELS WILL LOSE STABILITY



A STUCK OR WEAK SHOCK STRUT WILL TILT THE CAR, WEARING TIRES UNEVENLY ALONG ONE SIDE WHICH LEADS TO FAULTY ALIGNMENT

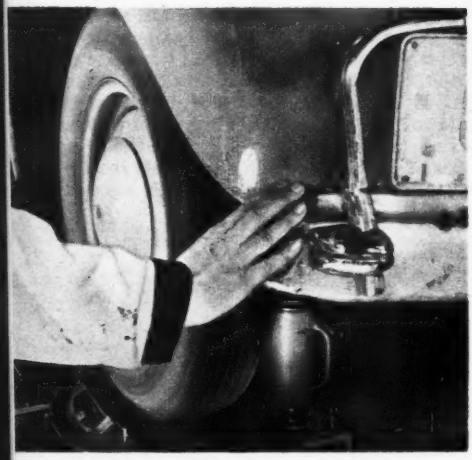
RIDING TROLLEY TRACKS EXERTS STRAIN ON STABILIZING LINKAGE—

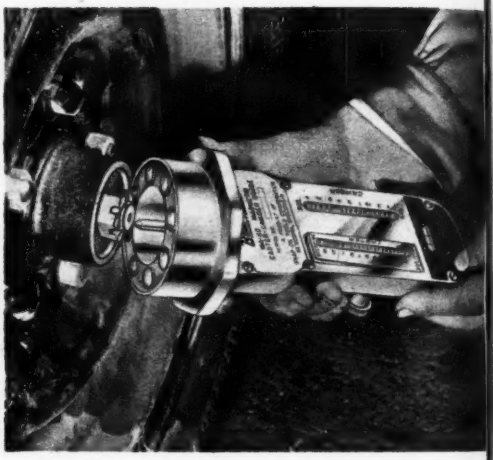
GETTING OUT OF THESE TRACKS IS DONE AS SHOWN HERE, THUS AVOIDING STRAIN, AND SAVING RUBBER



An error can occur when checking front wheels on a turntable if the rear wheels are not raised to compensate for the height of the turntable plate. Below: You can feel the grinding of a rough bearing by spinning the wheel and placing your hand on the bumper. Worn bearings affect alignment.

Front wheel "tramp" is sometimes due to tire distortion at high speed and not necessarily faulty wheel alignment. This tire is not rolling round because of faulty construction. Photo below shows a new type of magnetic gauge made by Snap-On used to check caster and camber of front wheels.





have negative caster or positive caster. There also is *toe-out,* but this is only in effect when the car goes into a curve. The main reason for toe-out is to prevent the inside wheel on a curve from being given a sidewise dragging.

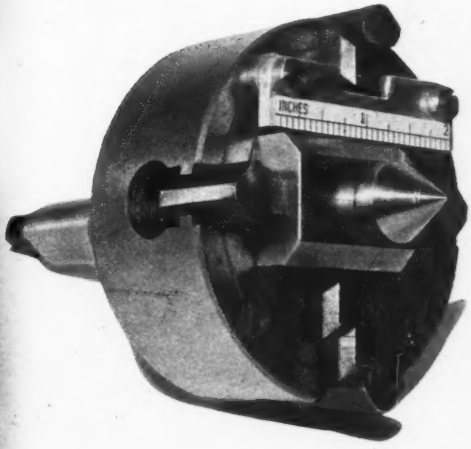
There are four more factors to be considered. One is *kingpin* inclination, which is simply the outward tilting of the kingpins at the bottom. What this does is to obviate the need for too much camber. These five factors work together to provide a merging of pivots. A sixth factor, *wheel balance,* is familiar enough but is too often considered all by itself. Actually, a well balanced tire and wheel may go into quite a shimmy if some of the aforementioned factors are out of whack. This inter-relationship between alignment factors is something to keep clearly in mind. The seventh factor, *tracking,* means keeping the rear wheels tandem and parallel to the front ones. So, brother, if your gig gets sideswiped by a truck and the frame is swayed just a little, don't look mystified if the car steers oddly and the front tires develop tread wear that can't be explained by the usual rules. Ever notice a car in front of you that seems to be moving in a crablike fashion? Such a car has had an accident, the frame is out of line, and the rear wheels no longer track the front ones.

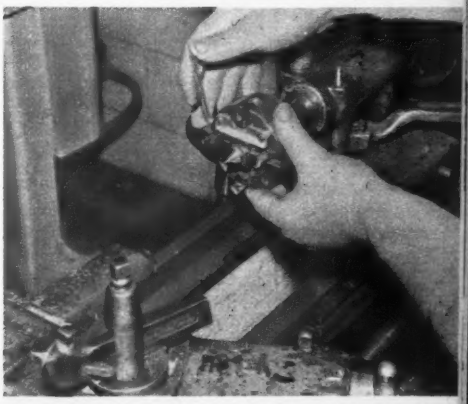
Which brings us to the final factor: adjustment of the steering gear itself and its linkage. Experts call this "steering control alignment." It's really the whole action between the steering wheel and the front wheels. A lot of [*Continued on page* 156]

Offset Taper Turning

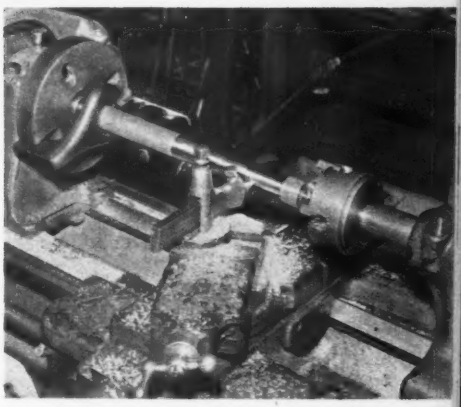
Avoid the annoyance of setting the tailstock over for turning a taper by using this fixture.

By Frank W. Harth



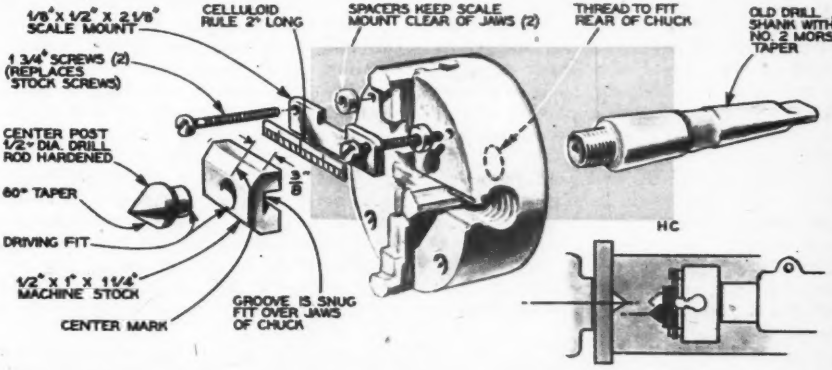


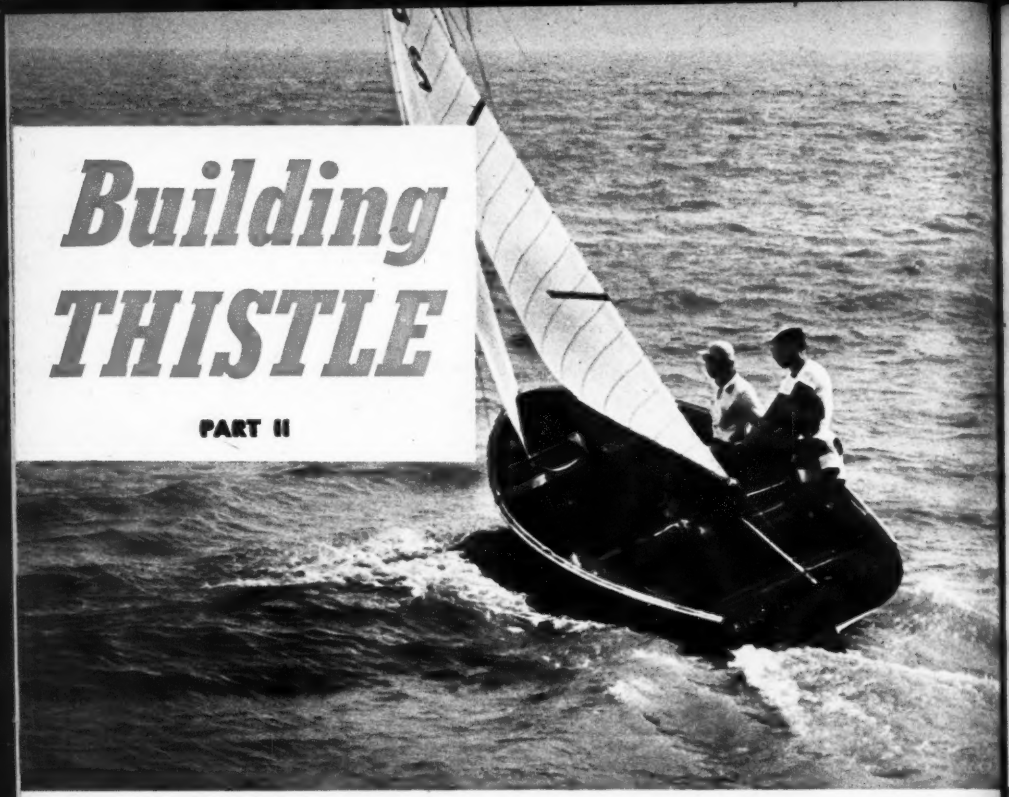
Employing the center mark that's etched on the slide and the plastic or steel scale, set off desired amount of offset with an Allen wrench.



This adjustable offset-center attachment fits the tailstock ram. Turn the taper exactly the same as if tailstock had been set off center conventionally.

A small four-jaw chuck is the principal component of this gadget. Replace the No. 1 Morse-taper shank with a No. 2 shank. Make the sliding member from machine steel. Pin or cement a 2-in. length of plastic or steel rule to a metal plate and screw the plate to the chuck as shown. Use the headstock center as a guide when lining up the scale's center mark. To keep the slide parallel to the lathe bed, scratch a mark on the tailstock ram and a matching mark on the back of the chuck. •





Building THISTLE

PART II

THE forward seat supports must be trimmed at the tops to make the rabbets come to the proper heights, then they must be fitted to the hull. The middle and after supports should be fitted to the hull with their tops just above the lower lines of the seats. Secure them in place, mark level lines at the heights of the under sides of the seats, and trim off the excess.

Now fit the outer edges of the seats to the hull and fasten them to hull and supports. On the surfaces of the seats, counterbore ⅜-in. holes for deck plugs to cover the screws.

Along with the seat assembly, the gratings shown in the Arrangement Plan comprise the structural bracing for the hull to resist the severe strains and twists caused by the weight of a heavy crew on the rail in a fresh breeze; so it is essential for these to be well anchored, glued, and screwed. The grating pieces are assembled before installation. Lay out the pieces bottom-side up and hold them together with 1-in. brads through the diagonal braces. Bore and fasten with 1-in. No. 8 screws. Two words of caution: the mast position being one of the critical measurements in the Thistle, be sure the mast thwart and mast step are accurately located; also, be sure to allow sufficient space under the gratings to receive the buoyancy tanks.

It may be necessary to trim the grating ends, which should clear the hull by about ⅛ in. Clamp the entire forward assembly into exact position (the forward side of mast should be 5 ft. from Station 0). Apply glue and secure to the undersides of the inwales with 1¼-in. No. 8 screws. Follow the same procedure for the stern grating. Now fasten the mast stanchions, using 2-in. No. 10 screws.

Locate the bow step as shown in the print, fit the cleats to the hull, round off the corners, apply glue, and fasten in place.

Next turn the boat upside down. The outside stem and keel pieces, which are molded on the hull, must be faired into the hull. Be sure to leave flat places wide enough for the ½-in. brass keel and stem moldings and for the bow plate.

The molded hull, being built up of thin veneers, may show a slight waviness. It has been machine sanded, but requires additional work. Since a belt sander can do a great deal of damage in inexperienced hands, there is no substitute for hand-finishing. Use an automobile body file for truing up the outside of the hull. It cuts

rapidly, takes off only the high spots, and leaves a finish that requires only a little sanding with 2/0 garnet paper to ready it for painting.

In the elementary Thistle kits, the boot top must be scribed. With the girth stick, measure down from the center line of the keel at each station, then secure a ¼x⅜-in. batten, 18 ft. long, in place with fine brads. Fair it up and scratch the boot top into the hull with a sharp tool.

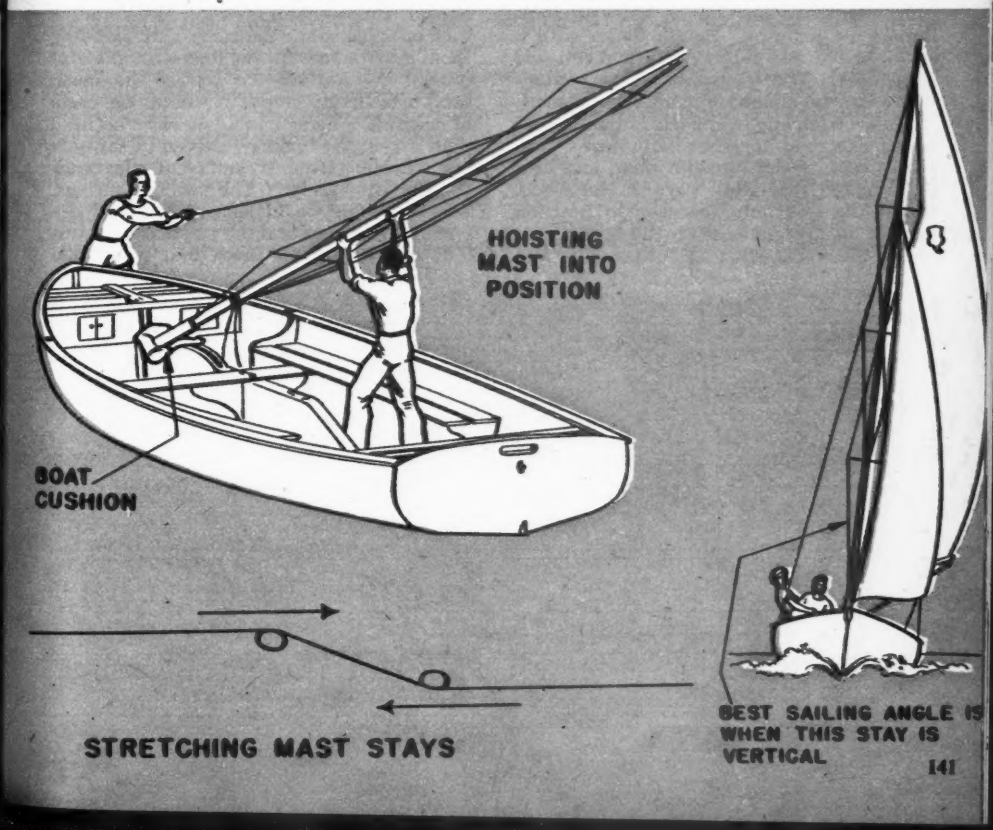
If your boat is to be used in salt water, paint the bottom with an antifouling copper paint or Woolsey's Vinelast. Three good coats should do. Paint the topsides and boot top with an undercoater tinted to approximately the color of the finish paint. Thin this first coat with 10 per cent turpentine for better penetration. Next fill all seams, screw heads, and other indentations with trowel cement. If holes are deep, second and third fillings may be necessary. Sand off smooth and flush. The second coat of undercoater should be undiluted. When dry, sand thoroughly. One or two coats of topside paint will then give you a smooth, glossy finish.

The rubber centerboard gaskets come next. They prevent water from surging through the centerboard slot. Lightly secure them in place with a few copper tacks, then screw on the brass keel molding, setting the keel shoes about 2 in. beyond the ends of the slot.

Turn the boat right-side up and install the gunwales. Their inner surfaces must be beveled to fit and then varnished. Starting at the bow, clamp them into place, setting them just below the edge of the hull, even with the inwales. Fasten them with 2-in. No. 10 screws on 4-in. centers, setting the screws either flush or in counterbores for ⅜-in. deck plugs. Plane the gunwales smooth and then sand them.

You are now ready to finish the inside of the boat. Put mahogany deck plugs in all screw holes, setting them in varnish with the grain of the plugs running in the same direction as the grain of the wood. Sand the seats and interior, rounding off all edges and corners and sanding out all scratches and other marks. Remove all dust with a vacuum cleaner and wipe the interior with a clean rag moistened in turpentine or varnish.

Now apply the first coat of spar varnish, thinning it with about 10 per cent turpentine. Stains and fillers are not necessary on good mahogany. Apply the second coat of varnish full strength. Give everything



a thorough sanding before applying the third and finish coats. Four coats are the minimum for adequate protection. The transom should be varnished along with the interior.

Installing the hardware is not difficult. The blueprints show the locations. The bow toggle should be set with the center rivet 12 in. below the bow plate. Each chain plate is secured with a 1½-in. No. 10 roundhead stainless-steel screw through the top hole into the seat and $\frac{3}{16}$-in. bolts through the lower holes.

It has been found that for racing the jib-sheet fairleads should be fastened to the seat slots about 8 in. forward of the middle seat supports, as shown in an accompanying sketch. Each buoyancy tank is held in place at its forward edge by two screws through the grating skirt into the seam batten and at the rear by a ¾x¾x4-in. cleat fastened underneath against the mast supports or transom.

In an elementary Thistle kit, the wooden part of the centerboard must be shaped. Thistle class rules require a minimum thickness of ⅞ in., but permit a symmetrical airfoil shape. The latest thinking on this subject suggests a shape that is essentially an elongated oval rather than the teardrop form. The most important requirement is a fair curve with no flats, humps, or hollows. Rough down with a spoke shave and follow with a plane and sandpaper. The lead part of the centerboard can be shaped with the same tools.

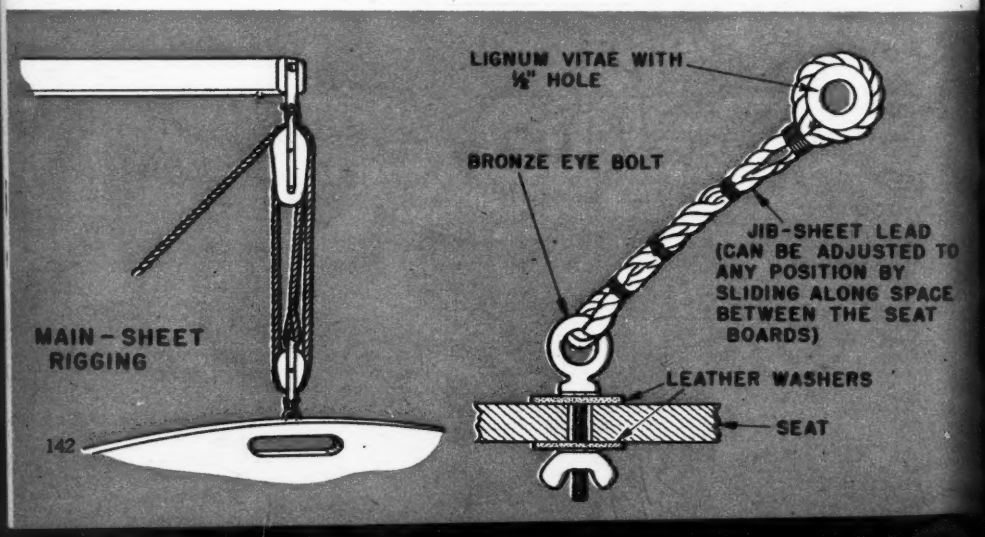
The wooden and lead parts of the centerboard are held together with brass butt straps that are let into the wood and lead and riveted through. Varnish the wood, clamp the assembly together in position against an upright post on the bench, and install the rivets, starting in the center and working toward the edges. Nip off each rivet fairly close so as not to have too much head to grind off. Try not to dent the butt straps. After riveting is complete, file and grind the work smooth. Install the centerboard hardware as shown in the blueprints. If you sail in salt water, finish the board with bottom paint instead of varnish.

The rudder is essentially the same as the centerboard. Maintain full thickness down the center and at the top where the cheeks are glued on. Rivet the upper fitting in place, glue on the cheeks, and shape and finish the head of the rudder, making sure it is the same thickness as the tiller. After varnishing, bend the tiller cap over the tiller. It should be a snug fit. Screws hold the lower edges of the cap and ¼-in. bronze rivets, headed over washers, go just below the tiller.

In the elementary kit, the mast comes to you hollowed out, glued, and machine shaped. All that remains to be done is to finish off its ends, sand and varnish it, and install the winches and rigging.

Be sure the winches have about $\frac{3}{16}$-in. end play between the cheeks. The mast is thicker than necessary, so plane down the butt, starting up near the groove, to give this clearance. After gluing on the cheeks, shape them, giving a ½-in. radius to the corners and bottoms and blending them into the mast at the tops with graceful tapers. Round off the top of the mast, sand it well, and give it at least three coats of varnish. Each winch pawl is secured with a 1-in. No. 8 screw driven in through one cheek. Give it sufficient clearance to operate freely. The winch springs, which prevent backlash, are installed between the flanges and the starboard cheeks.

When rigging the mast, first install the



spreader sockets and diamond stays. The sockets are flanged over the tangs to hold them tightly in place. The top spreader socket goes through the jib-stay tang, then is flanged over both the diamond-stay tang and the main-shroud tang. Cut off the sockets so they protrude about $\frac{5}{32}$ in. beyond the tangs. Flanging is started with a tapered punch such as a lathe center. Back up the free end of the socket with a hardwood or metal block on the bench. Complete each flange by hammering it until it is tight against the tangs. If the socket becomes distorted during the process, so that the spreader will not enter, stretch it to size with a drift and a little filing or reaming.

The diamond stays will be too tight and must be stretched to the proper tension after they have been strung over the spreaders. Do this by sliding two round bars, such as hammer handles, up and down with an offset, as shown in an accompanying sketch. Do this first on one side and then on the other, watching the mast to keep it true. The stays should be snug but not taut, should give a buzz when plucked rather than a musical twang.

Reeve the halyards by pushing a stiff wire through to pick up a fish line to pull the cables. Next insert the sheaves, which should turn freely. If there should be too much play, shim them with thin metal so the cables cannot jump off. The jib and spinnaker sheaves should be separated by a sheet brass spacer dividing the sheave box. The spreader tips should be peened enough to keep the stays from jumping out of the slots.

The reefing drum on the boom must be drilled to take the gooseneck, which should be a snug fit. Aim the drill downhill a trifle so as not to break into the sail groove. The rest of the rigging is shown on the blueprints.

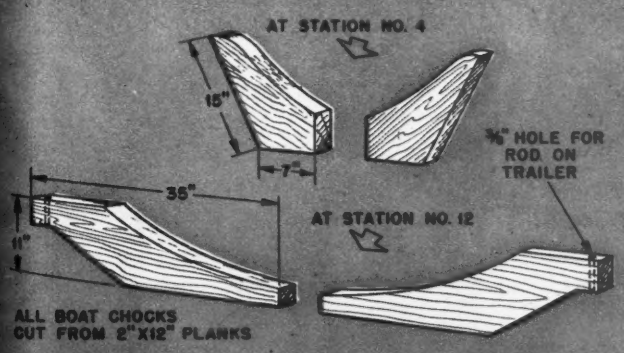
The buoyancy tanks rely for watertightness on the glue joints between the plywood and the seam battens, so make careful joints, especially at the corners, and use plenty of waterproof glue. First tack the battens to the side panels, making complete frames all around; then glue and tack the top and bottom panels in place, fit in the missing battens, and glue on the end panels. To test each tank, drill a $\frac{7}{32}$-in. hole through one of the seam battens and blow into the tank. *Do not* use an air hose, which will blow up the tank. If the tank will hold air in, it will keep water out. If you should find a leak, work glue into it and, after letting the glue set, try again. Three coats of paint complete the job.

Buy good sails and take good care of them. Keep your boat in tip-top condition —she will last longer and be a better investment.

A light trailer can be built or bought at reasonable cost. It will be handy for launching and storage and will add greatly to the fun of owning a Thistle, permitting you to visit other fleets and clubs. An accompanying sketch shows suitable boat chocks for the trailer. The Thistle can be easily loaded because the completed hull weighs just over 300 lbs. Setting up the mast is a one-man job requiring only a couple of minutes. Attach the main shrouds, walk the mast up as shown in one of the sketches, and attach and tighten the jib-stay turnbuckle.

Space does not permit me to write as I would like about sailing the Thistle. If you have done a careful job, you have a boat you really can be proud of.

Good Thistling!—*Y. E. Soderberg.* •



LARGE-SCALE PLANS

and Bill of Materials are necessary when assembling this boat. Send $5.00 to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Conn. Please specify Plan No. B-219.

MONTHLY

PHOTO CONTEST

1st Prize ($10.00) .....Helping Hand
Taken by Esther de Roche of Passaic, N. J., with a Rollei camera; 1/50th at f-11; Plus X film.

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Please address your entries to: Photo Contest, *Mechanix Illustrated*, 67 W. 44th St., N.Y.C. 36

$5.00 Award .....Jean
An excellent outdoor portrait by Dorsey Dobson of Warrensburg, Mo. Exposed at f-8.

$5.00 Award .....A Virtuoso?
National Graflex photo by H. W. Hilliard of Steubenville, O. Two No. 2 floods at f-3.5.

$5.00 Award .....Another Customer
A good snow scene by Grant Heist of Rochester, N. Y. Exposed at f-4.5 and 1/50th; XF Pan film.

The set-up used to test the sharpness of a camera lens. The ruler is suspended on the wall and illuminated by means of a photoflood lamp. The camera should then be moved back and forth until the millimeter markings on the ruler are no longer discernible through the pocket microscope on the box top.

Is Your Lens Sharp?

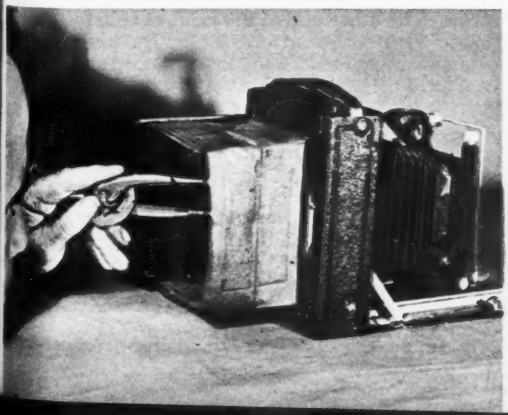
Do you really know how good the lens on your camera is? Try this test and see for yourself.

By Gilbert C. Close

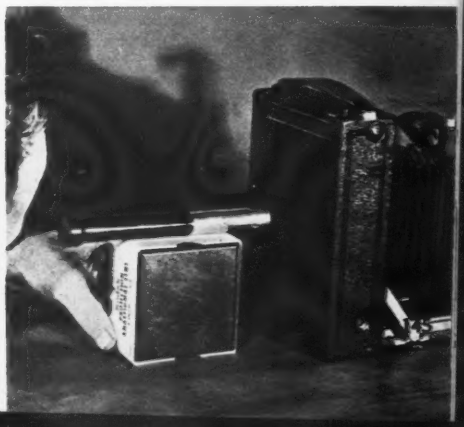
WHEN a print comes up "fuzzy" in the developer, the first thing the average amateur photographer blames is his lens. Ninety-nine times out of a hundred he is wrong. Modern anastigmat lenses are sharp—so sharp that they will resolve detail beyond the range of human vision. The better lenses resolve detail so small it becomes lost in the grain structure of the average film.

Many factors besides the lens can cause unsharp pictures. A few of these are camera movement, poor focus, over or under-exposure, faulty negative development, enlarger shake, or wrong focus of the enlarger [*Continued on page* 168]

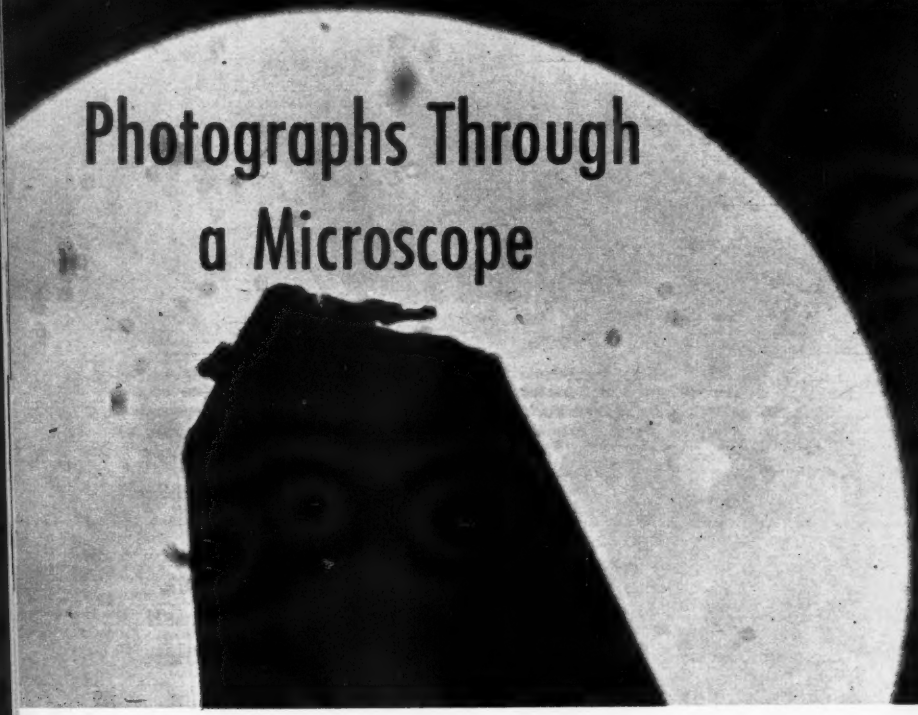
Start with camera about 10 feet from ruler and ground glass in place. Focus on ruler and measure image on ground glass carefully with a caliper.



The distance of the microscope objective from the camera lens will be the focal length of camera lens plus focal length of microscope.



A photograph of the tip of a phonograph needle taken through a microscope at 200x. Actual size of needle in upper right.



Photographs Through a Microscope

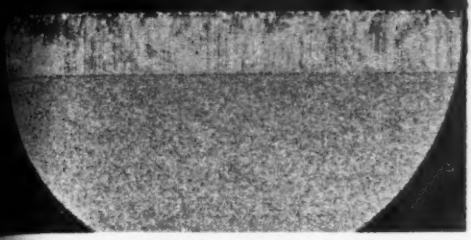
Do you know how to take photomicrographs? And how they differ from photomacrographs?

By George Carlson

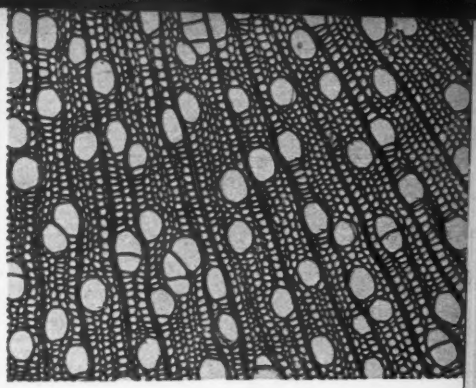
PHOTOMICROGRAPHY, pictures through a microscope, and photomacrography, extreme close-ups taken through a camera lens, are two of the most fascinating phases of photography. There are many subjects that the amateur can experiment with—cloth, food, seeds, feathers, insects and grains of sand.

The simplest type of close-up work uses supplementary lenses mounted over the regular camera lens. A supplementary lens permits the operator to work as close as three or four inches from the object to be photographed. Naturally, the camera must be equipped with a double extension bellows, or even a triple extension, in order to get a sharp image on the ground glass. When working at such an extreme range the image on the ground glass is always larger than the object being photographed. If your camera does not have sufficient extension you can get around it by using extension tubes. The main requirement, in using extension tubes, is that the lens can be readily removed from the camera so that it can be attached to one end of the tube. The other end of the tube, of course, is attached to the camera, taking the place normally occupied by the lens. The shorter the focal length, the greater the magnification.

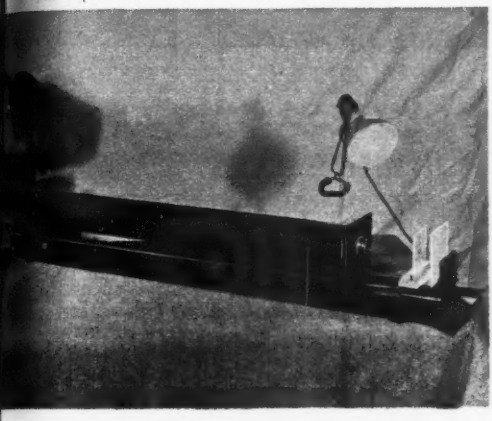
One of the pictures shows how an extension tube of cardboard was mounted on a Korelle Reflex camera. Of course, a light-tight seal at all points of juncture is an absolute must. The longer the extension tube, the larger the picture. However, too long a tube will result in some vignetting. This is negligible as generally only the

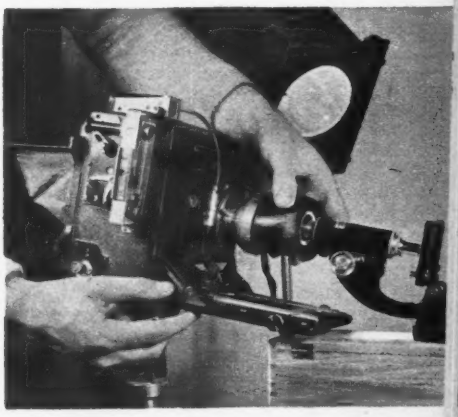


Cutting edge of an unused razor blade. Exposed at f-4.7 and one second on Panatomic X film. Photo below shows how extreme close-ups can be taken with extension tube instead of microscope.



A photomicrograph of a willow stem at 200 power. Below: How the camera lens is coupled to the eyepiece of the microscope with a light-tight tube. Spotlight at right is directed against mirror.



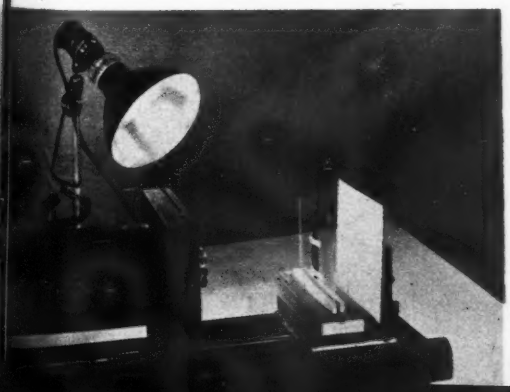


central part of the negative is important.

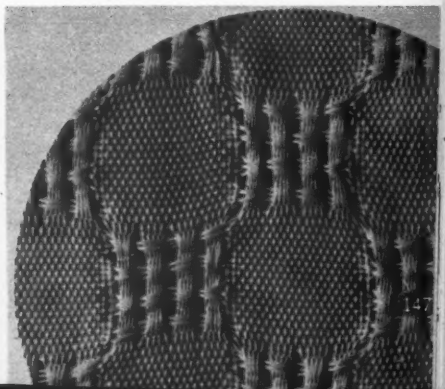
Focusing is best done by moving the object back and forth in front of a camera lens rather than moving the camera or adjusting the lens mount. As focusing is very critical, a simple screw device consisting of a threaded rod mounted in a block can be used. The rod passes through a hole in the block and into a wing nut. By loosening or tightening the nut, the block containing the specimen is moved to or from the camera lens.

Spotlighting is the best type of light to use. Because of [*Continued on page* 150]

When a photograph is taken with the camera lens at the end of an extension tube, the picture is called a photomacrograph; technique shown below.



A photomacrograph of a piece of fabric at a magnification of four times. A photomacrograph shows better detail at edges than a photomicrograph.



Your Dog Ought to be in Pictures

Mom and her pups generally become a blob of fur when photographed in a heap. Space them on a stairway for a picture really worth taking.

Is your dog practically a member of the family? If so, he belongs in your album.

HE sure does, and not because he happened to be around when you were photographing someone or something else. He ought to be the subject of some special shots. Pooch portraits are fun to make, but like any good picture it takes a little thought and planning to insure happy results.

Choose your setting, whether indoors or out, and arrange whatever props or lights you want to use before you bring Skippy or Poochie on the scene. Dogs aren't always patient and you'll get your best cooperation while the idea is still a novelty.

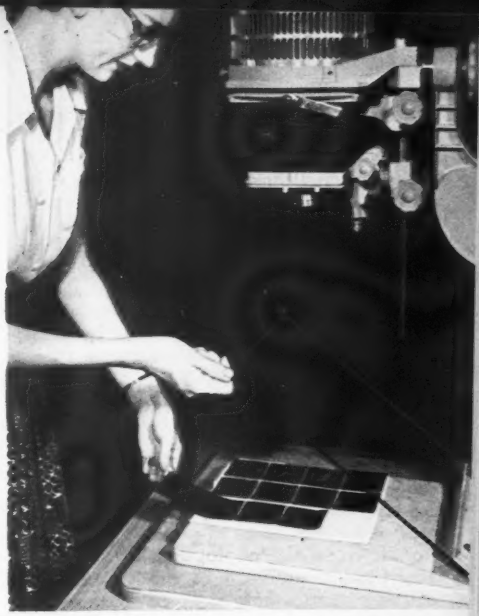
Select a plain background, one that will not take any attention away from the subject. If a suffi- [*Continued on page* 150]

Note how a plain black background showed up the head of this setter to best advantage.

Dogs in costume always seem to look like someone you know! Taken at 1/100th at f-16, Super XX.

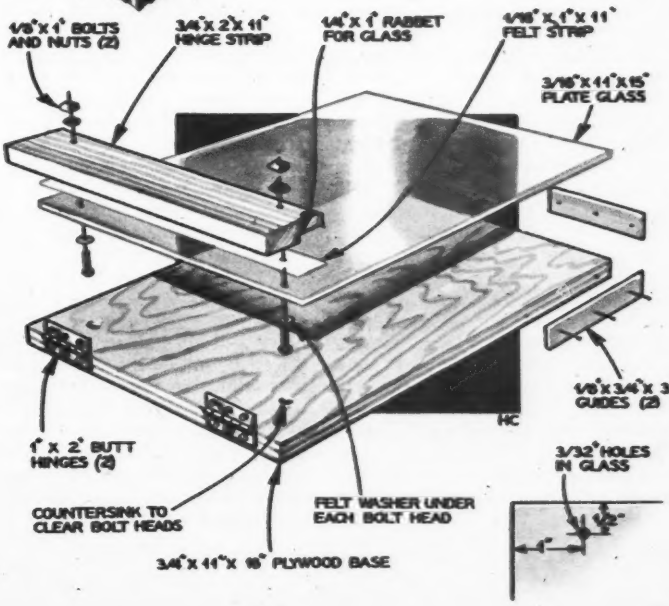
Darkroom Easel

Need a good darkroom easel? This one is especially designed for making borderless enlargements.



Completed easel ready for use showing paper guides in lower left hand corner.

AN 11x16 in. piece of plywood and a sheet of glass are the chief items you will need for making this handy easel. Due to its large size you'll find it indispensable for making and printing paper negatives and prints as well as for ordinary enlarging work. The holes in the glass may present a bit of a problem, but if you have access to a drill press it is child's play. Make a mound of putty around area to be drilled and mix a paste of Carborundum and water. Use a piece of thin-walled steel tubing as a drill. •



Through A Microscope

[Continued from page 147]

the magnified image, exposure time must be increased several times. In other words, the "f" values on the lens no longer applies. A new value must be ascertained called the "effective aperture." This new aperture is procured by multiplying the indicated "f" value by the distance in inches between the lens to the film and then dividing by the focal length of the lens. Let's assume that our lens is set at f-22 and the distance from the lens to the film is 39 inches. Multiplying 39 by 22 we get 858. Dividing by the focal length of our lens, which is say, 3 inches, we get 286 or f-286, the effective aperture—which is indeed a very small one. Therefore, you can see why the exposure is reckoned in seconds, and sometimes even minutes. With the set-up shown in the photograph an exposure of about one minute at f-22 yielded a good negative.

A photomicrograph is somewhat easier to take as no extension tubes are required, just a compound microscope and some sort of a coupling device such as shown in the picture to assure a light-tight seal between the camera lens and the eyepiece of the microscope. Formerly, good-quality microscopes were high-priced affairs and about the only acquaintance the average layman had with them was during a few sessions in a high school biology class or possibly a glimpse of one under a bell jar in his physician's office. Nowadays you can get a small microscope suitable for photomicrography for as little as $4. The one illustrated in the photo is made by the Edmund Scientific Corporation. It has a power of 200 and sells for about $13. Through it the picture of the phonograph needle shown in the lead photo was taken. Note the wedge-shaped appearance of the needle after several plays on a shellac record. The needle (actual size) is at the upper right hand corner. The picture was taken with a 4x5 Graphic camera and Panatomic X film with the lens set at f-4.7. A 500-watt spotlight was directed against the mirror of the microscope and the film was exposed for one second.

If you are planning to take photographs at magnifications of greater than 25 diameters you will have to use a compound microscope. Below this, you can use the lens of your camera mounted in an extension tube as described before. It is interesting to note that at about the same power (say 15 to 25 diameters) the photomacrograph will yield an image which is sharper at the edges than the photomicrograph which is generally sharp only in the central area. •

Your Dog In Pictures

[Continued from page 148]

ciently unobtrusive one isn't available naturally, create one. Use a piece of wallboard, a blanket, or anything plain that's handy. To show the dog off to best advantage choose a color that will contrast with his coat. The honey-colored cockers show off well against a dark background (green is a good color) and the black ones stand out against a light color.

It's a good idea to place the dog, or dogs, on a table or bench so that you can do your shooting on the dog's own eye level or from a low angle. This will emphasize the importance of your subject. By following this method outdoors you can use the sky for a background. It is true that unless you are really shooting close in, you'll get part of the table or bench, but this can be easily remedied by cropping during enlarging.

It goes without saying that your dog has a terrific personality. He (or she) is a smart dog, as anyone can plainly see! So keep that in mind when taking his picture. Use his favorite toy as a prop or as a means of attracting his attention in the direction you want him to look. Recall the things he's done, or the ways he's looked that have made you chuckle, or call someone else's attention to him. If you love his sad look, try for that in the picture. If his mischievous spirit endears him to the family, make it show in the snapshot.

As far as camera settings are concerned, the lens opening will, of course, be determined by the light available. A speed of about 1/50th of a second (approximately that of most box-type cameras) will work. But if you are using an adjustable camera, 1/100th or faster is preferable so that you can stop an unexpected movement.

For indoor pictures, photoflash is a better source of illumination than photoflood lamps because it enables you to shoot with short exposures. Fine dog pictures can be made with photoflood but there is more danger of blurs from subject movement because of the longer exposure required.

A good thing to remember is that animals and children are very much alike. Some of the same tricks employed in photographing baby are very effective with puppies. An alert and interested expression can be induced by suddenly showing a favorite toy or by making an unfamiliar noise to attract attention. Assistance from some other member of the family can come in very handy at this point. You can concentrate on the camera, ready to snap the picture at just the right moment, while your helper creates the necessary off-stage diversion. •

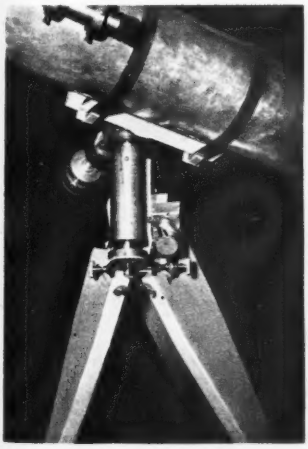
The Amateur Telescope Maker's Page

Conducted by Robert Brightman

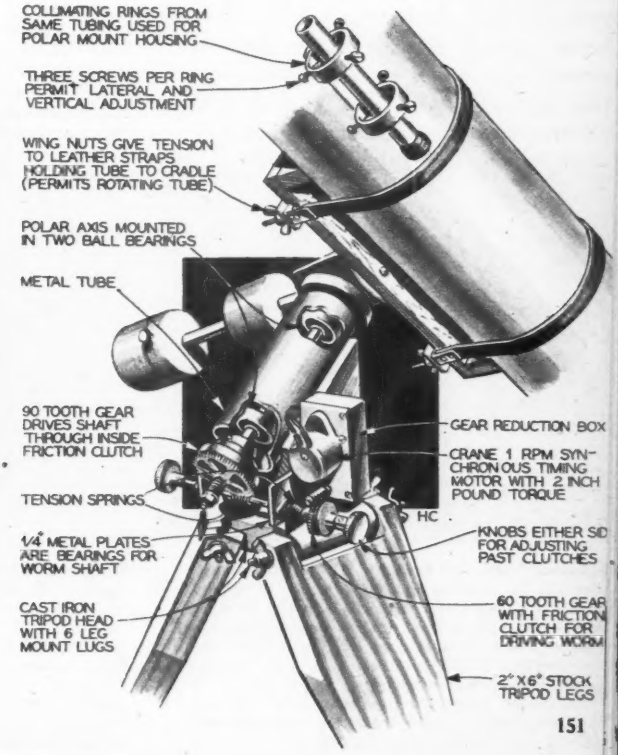
A Synchronous Drive Telescope

JOHN Schlauch of Rochester, N. Y. has come up with a really fine example of machine shop work as applied to a telescope. His instrument has a six-inch mirror and a 1¼ in. elliptical flat instead of the usual right angle prism. An innovation is the use of a circular support for the flat instead of the customary spider, to eliminate distraction effects about bright stars.

The tube of the 'scope is made of aluminum and is attached to the saddle by sturdy leather straps [*Continued on page* 188]



Close-up of driving mechanism shown in drawing at right. Polar axis is mounted on ball bearings.



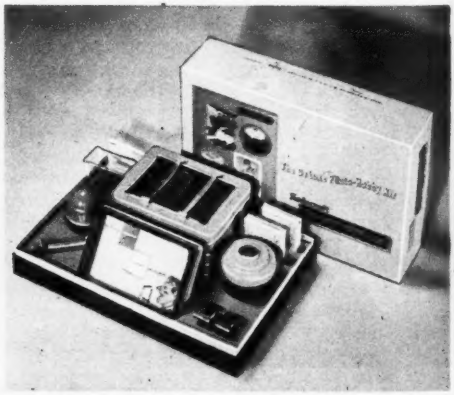
Now you can set up a "darkroom" *right in your kitchen*

Costs as little as 5 dollars
Takes 5 minutes Worth a million in thrills

So you always thought a darkroom was dark and mysterious, hard to set up and expensive. Well, here's good news. The old-fashioned darkroom has now emerged into the light of day! All you need is (1) a sink and (2) one of the Kodacraft outfits you see here. And when you want to branch out, all you need do is add inexpensive accessories such as you see on the opposite page. Ask your Kodak dealer to demonstrate this equipment.

Kodacraft Printing Kit (*displayed above*) **costs only $4.95.** You can have a world of fun watching your own pictures appear for the first time in a printing tray. And think of the pleasure you can have in making duplicate prints for friends, making greeting cards for special occasions. Use of the Kodak Velite Paper included in the kit permits printing under the lighting conditions of most kitchens or bathrooms. This kit contains the essentials you need for printing pictures—three 5 x 7-inch rocker-type trays, Kodacraft Printing Frame with set of three masks for nine negative sizes, 25 sheets 2½ x 3½ Kodak Velite Paper, graduate, Kodak Tri-Chem Pack, Kodak Darkroom Thermometer, Kodak Glass Stirring Rod, and complete book of instructions.

Kodacraft Photo-Lab Outfit—$8.75. Includes basic essentials for developing and printing pictures—three 5 x 7-inch rocker trays; Kodacraft Printing Frame with set of three masks for nine popular negative sizes; quick-loading Kodacraft Roll-Film Tank with 620-120, 616-116, and 127 roll-film aprons for easier developing; 25 sheets 2½ x 3½ Kodak Velite Paper; 8-ounce graduate; 2 Kodak Tri-Chem Packs; Kodak Darkroom Thermometer; film clips; and instruction booklet.



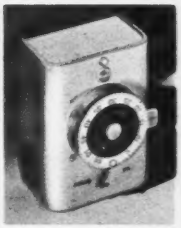
Kodacraft Advanced Photo-Lab—$14.10. Offers complete developing and printing equipment, featuring the easy-to-use Kodacraft Metal Printer for negatives to 4 x 5½ inches. Other items: three 5 x 7-inch rocker trays; Kodacraft Roll-Film Tank with 620-120, 616-116, and 127 roll-film aprons; Brownie Darkroom Lamp, Model B; 25 sheets 2½ x 3½ Kodak Velite Paper; 8-ounce graduate; 2 Kodak Tri-Chem Packs; Kodak Darkroom Thermometer; Kodak Glass Stirring Rod; 2 Kodak Junior Film Clips.

Kodacraft Roll-Film Tank—$2.53. The easiest tank on the market to load. Includes aprons for 620-120, 616-116, and 127 film.

Kodacraft Miniature Roll-Film Tank—$2.53. Permits simultaneous development of two rolls of 35mm. film or Bantam-size film (828).

Kodak Blotter Roll—$2.88. Corrugated backing allows air to circulate and dry prints more rapidly. Keeps prints from curling up.

Spring-wound Kodak Timer—$7.20. Covers all intervals up to 60 minutes. Both minute and split-second hands. Tilting base.



Kodak Electric Time Control—$13.50. Automatically times printing. Printer or enlarger plugs into control. Repeat timing possible.

And when you want to expand operations, you have a wide choice of inexpensive Kodak accessories

Kodak Utility Footswitch—$10.00. Keeps your hands free. Controls enlarger, printer, or safelight lamp. Dull light marks location.

Kodak Automatic Tray Siphon—$4.50. Converts sink or tray into automatic washer. Attaches to water tap. Washes prints, films.

Kodak Masking Easel 11 x 14—$9.60. Facilitates cropping, holds paper flat. Heavy, non-wobble felt base insures steadiness.

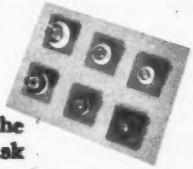
Kodak 2-Way Safelamp—$4.50. Its unique construction permits direct or indirect lighting—or both. Safelight filter and bulb supplied.

Kodak Adjustable Safelight Lamp—$7.40. Has double-swiveled shank and bracket. Attaches to wall, bench. Includes safelight filter.

Kodak Hobbyist Enlarger (*left*) **$44.00** (incl. lens). Most brilliant enlarger in this price field. The secret is a highly reflective coating inside enlarging head. Cold-light illumination protects negatives. Rotating negative holder loads easily.

Kodak Flurolite Enlarger (*right*)**—$99.50** (without lens). Has all the advantages of the "Hobbyist" plus many more uses. With accessories, the 2¼" x 3¼" "Flurolite" quickly converts for copying, slide making, other uses. Cold-light protection for negatives.

Kodak Enlarging Lenses (*right*) for the "Flurolite" range from the Kodak Enlarging Ektanon Lens, 50mm. *f*/4.5—$14.00 . . . to Kodak Enlarging Ektar Lens, 4-inch *f*/4.5—$49.90.



Your Kodak dealer will be glad to start you off the right way in developing and printing pictures. Ask him all about it the next time you see him.

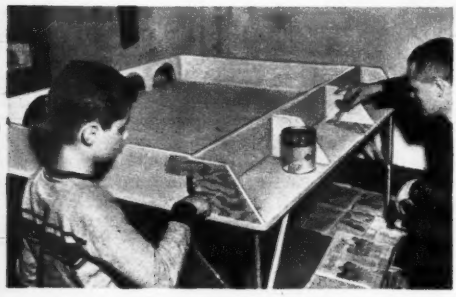
Prices subject to change without notice

Eastman Kodak Company, Rochester 4, N. Y.

Kodak
TRADE-MARK

Table Tennis Railroad Pike

[*Continued from page* 123]



Have your youngster help you with the painting and he'll feel that he has contributed his part to this father and son project. Photo shows primer being applied prior to painting.

switch is wired in series with an Amphenol male receptacle so that it controls *all* the current. In other words, this is an emergency switch which cuts off the 117-volt AC line and of course the low voltage system. A separate toggle switch controls the low voltage accessory transformer. The other toggle switches are used as indicated before, for separate accessories.

Before laying down the tracks cover both halves of the table with "grass." This material is available from model railroad stores and forms a very effective ground surface. All the connecting wires of course, are underneath the table so that no wires at all show on the surface.

When you have gotten this far you may be a bit tired of it all and anxious to play a bit of table tennis. Very well. Let's start in with the table tennis halves. Break all sharp edges and corners with medium sandpaper and then paint the halves with clear Firzite. You'll find that this material effectively controls the "wild" grain of fir. After drying overnight, cover the playing surface (look over both halves carefully, you'll find that one side is good, while the other side may have a few knots) with a coat of dark green flat paint. If you don't use the Firzite you may have to apply two coats, otherwise one may do. Paint half-inch white border along outside edge of each half. If you plan to play "doubles" paint an extra line down the middle.

You will note that each corner of the playing surface is protected by a steel angle. This is an absolute necessity, as otherwise you will find that the corners tend to chip as the halves are removed when you want to use the train set. Each corner angle is secured with four wood screws. Roundhead screws are preferred, as they offer additional bumping protection. The legs of the angles which meet in the middle of the table should be mortised in place and secured with flathead wood screws instead of the roundhead screws used elsewhere. This is necessary so that table halves will fit nicely without a space between them.

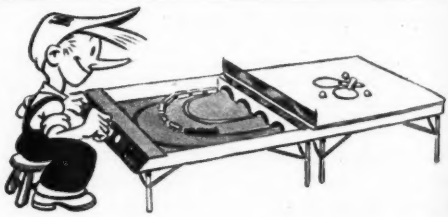
Three window sash locks are used to hold the railroad table together. Put one in the middle, on top, and the other two about six inches from each edge at the bottom. If you like you can add two more sash locks to the top of the table tennis surface, but these are not an absolute necessity as you'll find the table halves shift very little.

Instead of the usual clamping arrangement which secures the net to the table (which always chews up the wood) use the channel arrangement shown in the photograph and indicated in detail on the drawing. Tension is achieved by sliding the net brackets outwardly and locking them in place with ¼x20 thumbscrews.

And now for some table tennis—or are you going to play with your youngster's trains? •

PARTS LIST
(excluding railroad equipment)

1 ¾x5x9 plywood panel (for base)
1 ⅝x5x9 plywood panel (for playing surface)
1 ¾x4x6 plywood panel (for sides)
8 folding steel legs
1 ¼x1x5 Masonite panel (for control section)
1 Voltmeter, 0-15 volts.
1 Ammeter, 0-5 amperes.
24 Toggle switches
4 Banana jacks
1 Amphenol male receptacle
1 Rubber-covered connecting cord
8 ⅝x2-in. steel angles (for protecting corners)
1 Ping Pong net and racket set
2 steel channels and wing bolts for supporting net.
5 Window sash locks (3 for table, 2 for playing surface)
32 No. 10, ¾-in. roundhead screws for legs.
24 No. 10, 1-in. roundhead screws for corner angles.
8 No. 10, 1-in. flathead screws for corner angles.
96 No. 8, 3-in. flathead screws for sides.
16 No. 6, 1-in. flathead screws for control panel.
4 25-ft. lengths of stranded, tinned wire, (each of different color)
Paint, flat green for playing surface; flat white for boundary lines; Firzite for primer; gray for rest of table.



ARE THESE MISTAKES HOLDING YOU BACK?

If you're not getting ahead as fast as you'd like, check these possible reasons. Find out why you're not a success and what you can do about it.

YES NO

☐ ☐ **Do you put things off?** To get anywhere you have to make a start.

☐ ☐ **Do you really want to succeed?** Isn't there something you want enough to work for it? Marriage, a new home, money for your family—all depend on your advancement.

☐ ☐ **Are you unwilling to give up temporary pleasures?** Some people think more of a good time now than of promotion and higher pay later on.

☐ ☐ **Are you too lazy to plan ahead?** You've got to manage your life, plan for success and stick to it.

☐ ☐ **Are you afraid of responsibility?** In a bigger job you'll have to make decisions, act, *be* somebody.

☐ ☐ **Are you short on courage?** It takes grit and determination to set a course and stick to it.

☐ ☐ **Is your education limited?** The good jobs go to men who *know*—men with sound training in their field. I. C. S. offers you that training.

☐ ☐ **Do you think you can't afford specialized training?** College may be too expensive, but home study lets you earn while you learn, at 1/10 the cost.

☐ ☐ **Do you hesitate to find out where to get training?** If you shy off from taking the first step, you'll never achieve success.

One out of three who read this page and check their shortcomings will *do* something about it. Two will stay in the rut. One will plan for self-improvement and stay with it till he gets there. Are you the one?

I. C. S. has helped train nearly 6 million men and women for better jobs. Among its 391 courses there's one that can help *you* succeed. I. C. S. lessons are clear, direct, authoritative. They give you bedrock facts and theory with practical application. Studying at home you can progress at your own speed, have the advantage of individual instruction. Choose the course you need from the list below, and *mail the coupon today!* We'll send you full information plus free book, "How to Succeed."

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☐ Aircraft Engine Mechanic
☐ Airplane Drafting

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☐ Architecture
☐ Arch. Drafting
☐ Building Contractor
☐ Estimating
☐ Carpenter and Mill Work
☐ Carpenter Foreman
☐ Reading Blueprints
☐ House Planning
☐ Plumbing
☐ Heating
☐ Steam Fitting
☐ Air Conditioning
☐ Electrician

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☐ Accounting
☐ Bookkeeping
☐ Stenography and Typing
☐ Secretarial
☐ Federal Tax
☐ Business Correspondence
☐ Personnel and Labor Relations
☐ Advertising
☐ Retail Business Management
☐ Managing Small Business
☐ Sales Management
☐ Salesmanship
☐ Traffic Management

CHEMISTRY
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☐ Analytical Chemistry
☐ Petroleum—Nat'l Gas
☐ Pulp and Paper Making
☐ Plastics

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☐ Structural Drafting
☐ Sheet Metal Drafting
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☐ Mechanical Drafting
☐ Machine Design-Drafting
☐ Machine Shop Practice
☐ Tool Design
☐ Industrial Instrumentation
☐ Machine Shop Inspection
☐ Reading Blueprints
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☐ Railroad Administration

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Occupation _____

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Care and Feeding of Engines

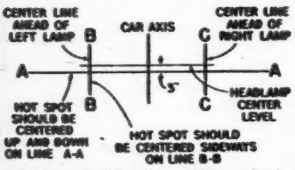
BY S. P. CORP

RADIATOR LEAKS

During cold weather there is a tendency for "permanent" anti-freeze to seep through joints impervious to water. In addition to checking all hose connections and water-pump gaskets before putting in anti-freeze, it is well to check the radiator coolant level often during the winter to make sure seepage is not causing a loss.

HEAD LAMPS AND SAFETY

For safe night driving, head lamps should be checked at intervals. Place your car level on the driveway with tire pressure up, no passenger in the car, and lights 25 feet from garage door.

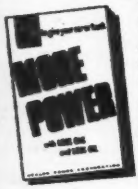


At the same height from the ground as the centers of head lamps, draw the upper horizontal line of this chart. Three inches below this line, draw line AA. Now sight over car hood to mark center of car on garage door, measure distance between centers of head lamps, divide by two, and mark vertical lines BB and CC.

Both lamps should center on the spots where BB and CC cross AA, when "brights" are on. If they don't, remove head lamp rims and use horizontal and vertical adjusting screws to center each lamp while covering the other.

When left lamp centers on BB-AA and right lamp centers on CC-AA, switch to the low beam (dims). Both low beams should be below line AA. If they are not, check lamps for correct installation. The index boss of the lamp may not be fitting into the recess of the lamp body.

THIS BOOKLET IS YOURS



This new free booklet, "MORE POWER, Less Gas, Less Oil," is yours for the asking. It offers much useful help on car care, and facts on Sealed Power KromeX Ring Sets, which will control oil even in badly tapered or out-of-round cylinders. Address a postal card to Sealed Power Corporation, Dept. J-2, Muskegon, Michigan.

Car Care

[*Continued from page* 138]

trouble can nest in these parts, especially if the front end has been neglected and the car has been roughly handled. The steering gear itself should be adjusted on its high spot for best results. After many miles of use even a well nourished gear may need to be adjusted for a new high spot. Right here I want to stress the point that often mere lack of steering gear lube will cause the car to steer as hard as it would with incorrect caster, camber or toe-in. A leak at the gear housing is a common cause of such trouble.

I remember one car which would shimmy unless the owner put in a fresh shot of lube, heavier than that specified by the car manufacturer. That was no way to meet the problem, but it clearly demonstrated the close tie between lubrication and the behavior of the front wheels.

If the car steers hard when you are parking, assuming tires are properly inflated, and if there's a feeling of the steering being cramped, by all means suspect the gear housing of being loose where it is attached to the frame. One owner found nothing wrong with the gear box but his checking showed up a crack in the frame. That explained the bad steering and the excessive tire wear, front as well as rear.

Often alignment conditions are temporary, due to some abnormal situation such as overloading. Speeding may be an invitation to alignment trouble through encouraging wheel balance weights to come loose. I have lost them this way, sometimes to the tune of a dented fender. If properly installed, weights should not fly off, but there are plenty of exceptions. Speed, plus rough roads, again spell an expensive combination. Checking tire treads for embedded nails and glass is another way to avoid misalignment trouble, for a puncture means you will need to re-balance the particular tire and wheel. Meantime the front wheels may be shimmying. Don't consider the tramping and snaking of the wheels merely an annoyance. Such misbehavior is a terrific shock to the front end. It may be as bad as striking the curbing with one of the front wheels when carelessly stopping the car in an angle parking space.

Leakage of lube from the front wheel bearings, or fluid that has escaped from one of the brake pistons will cause rough braking and hence erratic steering. Watch those front wheel bearings, too. If worn or loose or too tight they will cause trouble in the steering system. Expect wheel tramp, or worse, if shock absorbers are allowed to run without enough fluid. •

Sportsmen Rally to the "Action Test" Ride

PERFORMANCE MAKES

KIEKHAEFER

MERCURY

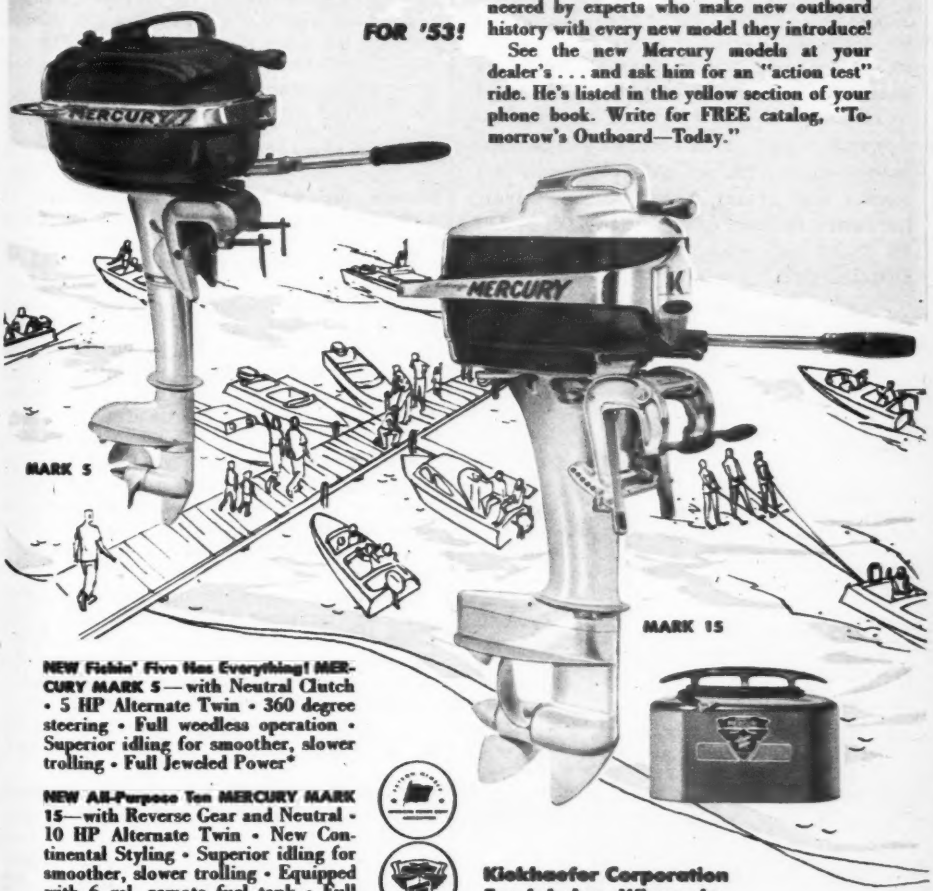
AMERICA'S MOST-WANTED OUTBOARD

FOR '53!

Take an "action test" ride with any of the five magnificent Mercurys for 1953! *Feel* the surging, singing power as you crack the throttle. *Listen* to the soft-throated murmur of Mercury's sweet-running powerhead as you sample its new superior idling speeds. *Thrill* to the quick-responding performance *only* a Mercury can deliver!

Then *choose* the outboard that's "most wanted" in America, according to independent surveys. Move *up* to a Mercury—safety engineered by experts who make new outboard history with every new model they introduce!

See the new Mercury models at your dealer's . . . and ask him for an "action test" ride. He's listed in the yellow section of your phone book. Write for FREE catalog, "Tomorrow's Outboard—Today."



NEW Fishin' Five Has Everything! MERCURY MARK 5—with Neutral Clutch • 5 HP Alternate Twin • 360 degree steering • Full weedless operation • Superior idling for smoother, slower trolling • Full Jeweled Power*

NEW All-Purpose Ten MERCURY MARK 15—with Reverse Gear and Neutral • 10 HP Alternate Twin • New Continental Styling • Superior idling for smoother, slower trolling • Equipped with 6 gal. remote fuel tank • Full Jeweled Power*

**Ball and roller bearings throughout*

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Features of Mercury motors are protected by issued or pending patents.

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Reversible or non-reversible protractor head, built in level, hardened blade. 12, 18, and 24 inch sizes. Also Metric.

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DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK
HACKSAWS, BAND SAWS and BAND KNIVES

Your Heating Dollar

[*Continued from page* 107]

dampers. By carefully experimenting with various settings of these dampers, you can put the heat from the unit where you want it.

The top part, or bonnet, of the round-cased furnace should be insulated with asbestos paper and all pipe joints should be taped with the same material. It is not necessary to insulate the outer casing of the furnace since the inner casing holds the heat in sufficiently.

There are various types of automatic controls on the market. The man who invests in these controls will discover they soon pay for themselves. This is particularly true of the electric damper motor that can be installed on the hand-fired coal-burning furnace. This control automatically opens the small draft door when the thermostat upstairs calls for more heat and closes the draft when the desired temperature has been reached. Most oil or gas-burning units have regular thermostatic controls, but a day-night timer clock such as the Chronotherm can be installed in place of the regular thermostat with excellent results in fuel saving. This device lowers the temperature automatically at night and returns it to normal at any given time the following morning.

Up to here, we have discussed heating systems themselves in relation to fuel savings. Most modern homes are completely insulated and many owners of older homes are having their homes insulated. Fuel savings from this average 30 to 35 per cent and can be as high as 50 per cent! If you can't afford a *complete* insulation job, at least do the attic.

There are a number of other ways to save fuel dollars. For instance, a lot of heat loss is due to windows and doors. This can be offset by the installation of storm doors and windows. If the house has unusually large glass areas, draw the blinds and drapes at sundown.

If you have hot-water or steam heat, never cover the radiators with metallic paint. This tends to reflect the heat back into the radiator. Instead, use an oil paint. Another trick with radiators is to place shiny pieces of metal or painted boards behind them as reflectors.

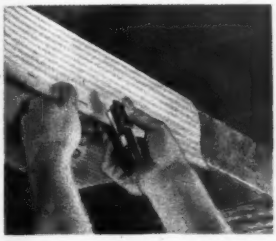
A good weatherstripping and calking job on windows and doors is worth the investment.

Keep all unused rooms closed off. Don't forget to close the dampers in the ducts serving them. Keep all closet and cabinet doors closed as much as possible—you will cut down the number of cubic feet to be heated. Not only close windows, *lock them*. This tightens the sash, preventing seepage of cold air and excess heat loss. •

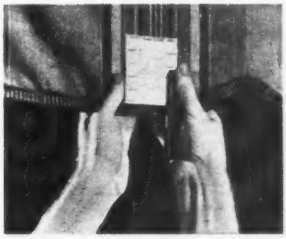
FASTEN IT FASTER

PLASTIC SCREENING can be tacked to frames quickly and easily with *Bostitch B-8* used as tacker.

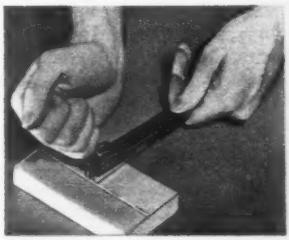
PUT WRAPS on your paint brushes between jobs. *Bostitch B-8* has removable base for getting into tight places.



STOP HEAT LOSS by covering warm air ducts with asbestos paper. *Bostitch B-8* makes it an easy, one-night project.



TORN CANVAS on awnings or furniture can be mended by stapling parts with *Bostitch B-8*.



SANDING BLOCKS are easy to make when you tack sandpaper to blocks of scrap lumber with *Bostitch B-8*.

KEEP PATTERNS IN PLACE by stapling them to material to be cut. Lift them easily with *Bostitch B-8's* staple remover.

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Slightly higher in the West and Canada

IT'S A STAPLER!
IT'S A TACKER!
IT'S A STAPLING PLIER!
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Bostitch gives you the only fasteners with staple remover attached.

with the *Bostitch B-8*
WITH REMOVER

The Bostitch B-8 is one of 800 Bostitch staplers and stitchers made for home, office and industrial use. For help in solving production line or shipping room fastening problems, write: BOSTITCH, 562 Mechanic St., Westerly, R.I.

BOSTITCH
fastens it better AND FASTER with wire

Danger! Men At Work

[Continued from page 66]

bounced once and started to sink immediately because of its loaded fuel tanks. Tuttle shoved the hood back and inflated his life vest. Then he ripped open a packet of yellow dye to mark his position in the water and a few minutes later the amphibian taxied over the pounding waves.

What happened to jet tester Tuttle? "All I got out of it," he grinned, "was a stiff neck."

It was all in a day's work—but no wonder the insurance companies give his job a cold shoulder.

No. 2 on the list are auto and motorcycle racers. And again you can't blame the insurance guys especially after you get a glimpse of a typical evening at the stock-car races, one of the fastest growing spectator sports in the country. Says Duke Donaldson who promotes a number of races in and around New York City:

"On any given night there are about 80 stock cars racing. By the time the races end, 40 of them are usually wrecks, half of these so bad they'll never be driven again. And in all probability one of the two ambulances that usually stands by will be on its way to a hospital."

Any wonder that these fellows can't get life insurance?

The gruelling grind of carnival acrobats who knock themselves out with exertions after long, strength-sapping trips from town to town, puts them in the No. 3 danger spot. To lure throngs they perform the riskiest possible stunts, take the longest chances. They dive into shallow tanks from great heights, fly through the air with the greatest of ease, whirl and tumble on tiny platforms atop rickety rigging. The type of flying they do, strangely enough, hoists them a notch above military pilots on the risk roster. The latter are No. 4 and it goes without saying why they occupy a choice spot.

Deep sea divers, No. 5 on the list, are within a handclasp of death every moment they're in the murky depths. Something can go wrong with the air supply and they suffocate. Or the exhaust valve can go haywire, pumping air into the diving suit and blowing it up to grotesque proportions until it bursts. Then the diver is pinned in the ooze of the ocean bottom by more than 200 pounds of equipment.

A diver can be a victim of the "squeeze" and the "bends." In the former, air is not pumped down rapidly enough to offset the pressure of the water and the diver is literally squeezed to death. In the "bends," nitrogen bubbles form in the bloodstream from too rapid ascent, doubling up the diver with excrutiating pain. If the bubbles reach the brain, they can kill. A diver with "bends" is rushed to a decompression chamber immediately.

Just below divers on the danger list are steeplejacks, No. 6. Actually, there are only some 300 real steeplejacks in the entire country—men who are thoroughly trained riggers, masons, welders, carpenters and the like and who work their trades in the dizzying heights.

Steeplejacks who work for a company get from $125 to $200 for a 40-hour week and, since they can't get life insurance, are covered by the workmen's compensation laws of the various states.

Danger? What do you think? You're climbing a 30-foot chimney that juts straight up from a 17-story building. You throw your hook over a coping that looks firm but which cracks loose the second you put your weight on the roof. Down you go, along with a 500-pound slab. If you're lucky, as one steeplejack was not long ago, the slab just pins you to the edge of the roof. But it might crush you or send you to eternity far below.

No. 7 in peril are the men who chauffeur nitroglycerine, the tricky, syrupy liquid which was the most powerful explosive in the world until the atomic bomb came along. These fellows work in the oil fields where deposits clog the producing wells and have to be blasted away.

There's no predicting what nitro will do. Sometimes it goes off without warning and without a bounce. Sometimes it's just the opposite. Not long ago a truck's brakes failed on a hill. It jounced and rumbled more than 700 feet, hitting all the bumps en route. The driver had long since consigned himself to Kingdom Come, but the blast never happened.

Slow death by radioactive rays came joltingly into the news with the atom bomb. But what few persons realize is that radium sprayers on the job face this peril of poisoning every second. Hence their position as No. 8.

There's a new type of steeplejack these days, thanks to TV, and he earns himself a special listing for risky jobs. He's No. 9 on the list. All over the U. S. new station antennae are shooting skywards and there'll be many more now that the Federal Communications Commission has authorized more than 2,000 new TV stations.

Logging riggers are No. 10 and if you have ever seen pictures of the way these fellows climb the trees just like monkeys, depending

[Continued on page 164]

RACING'S TOP POWER PLANT!

THE 270 OFFENHAUSER

TREND, INC.—PHOTO

"I build racing's top engine. Here's why I recommend Champion spark plugs for your car." Louis Meyer

Louis Meyer, three-time winner of the Indianapolis 500, three-time national AAA racing champion, today builds America's foremost racing engine—the Offenhauser, product of the Meyer-Drake Engineering Company. Its success in competition is without parallel in automobile racing.

Says Meyer, "We specify Champion Spark Plugs as standard equipment for the Offenhauser because we've never found any spark plug that can equal Champion in that extra notch of power and speed and extra dependability which you must have for championship performance. Speaking from broad experience in this field, we know that all Champion Spark Plugs are built to *one, single* exacting standard—the best that top research, engineering and manufacturing can produce.

"Therefore, I say to every motorist, 'If you value the very best performance of which your car is capable, you'd better specify Champions for your car. In my book they're tops for every engine, and the record books prove it'."

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

FOLLOW THE EXPERTS — Demand **CHAMPIONS** — FOR YOUR CAR!

The How of Ford's

Dr. Roy K. Marshall explains one of the 41 "Worth More" features of the '53 Ford

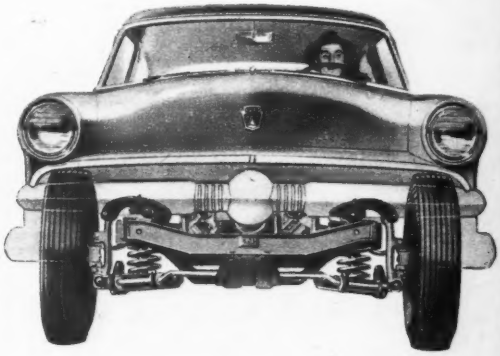
• "A popular misconception is that a car has to have excessive weight to ride smoothly and evenly. Yet, if weight were the main factor, then heavy trucks would ride better than passenger cars! The secret of a smooth ride is not weight but the coordinated action of such ride controlling elements as shock absorbers, front and rear suspension, tires, and seat springing. Ford engineers have developed this concept to a remarkable degree in the new '53 Ford . . . in fact Ford's new Miracle Ride reduces rough roads to 'carpet smoothness.' "

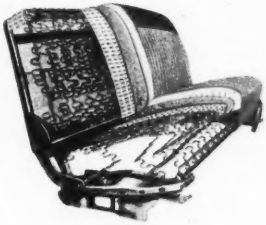
Visit your Ford Dealer and try Ford's Miracle Ride today

new Miracle Ride

How road shock is reduced 80%. "When Ford chassis engineers increased the vertical travel of the front wheels and softened the front suspension compression bumpers in the '53 Ford, they reduced front end road shock by as much as 80% ! Then rear springs were redesigned to just the right resiliency for precisely harmonized action with the front springs so that the car moves up and down evenly without 'pitching' from front to rear. The development of more responsive shock absorber action was the next step—an all-important one to obtain perfect coordination between 'shocks' and springs at both front and rear. The result was an amazingly soft, smooth, *level* ride on boulevard or rough back road."

How a wider front tread increases stability. "A car with a wider tread in front is far less susceptible to sidesway, especially on curves. So Ford engineers designed the front tread two inches wider than the rear tread for greater stability. They mounted rear shock absorbers diagonally to further reduce 'heeling.' "





How foam rubber cushions help. "The little road shock that *can* get past the chassis gets no further than Ford's foam rubber cushions. They sit soft, but firm, on non-sag springs, add the comfort of living room chairs to the other advances of Ford's new Miracle Ride."

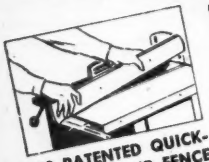
'53 Ford

White sidewall tires optional at extra cost. Equipment, accessories and trim subject to change without notice.

TODAY'S GREATEST SAW VALUE FOR YOU!

8" TILT/ARBOR SAW

BUILT HEAVIER! With More "Extras" Furnished!



PLUS PATENTED QUICK-POSITIONING RIP FENCE!

AND POPULAR PRECISION-GROUND GREY IRON TABLE!

See for yourself! Whether finishing your home, remodeling, or refurnishing—you can't find an 8" saw with the dollar for dollar value of the Atlas.

It's solidly built — weighs 130 lbs. Table is 22" x 18" — *precision-ground.* Saw cuts 2⅜" deep—table always flat. Sealed-for-life ball bearings.

Blade controls are Acme-threaded. Patented Atlas *double-locking* rip fence *lifts* off and on. Standard equipment includes: mitre gauge, stop rods, blade guard, splitter, motor mounting base, 8" rip-crosscut blade, V-belt, motor pulley. Be sure to see the Atlas before you buy any saw.

NEW 20-PLAN BOOK ONLY 50¢

Contains 20 original furniture and furnishings designs with step-by-step construction details. $.50 postpaid, $.65 outside U.S.A.

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☐ Please send woodworking tool catalog.
☐ Inclosed is _____ for _____ 20 Plan Books.

Name _____

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City, State _____

Danger! Men At Work

[*Continued from page* 160]

entirely upon their sense of balance, the agility of a cat and a good share of luck, you can readily understand why.

Riveters who catch hot, flying metal hundreds of feet up while balancing precariously on slender perches face the same kind of sudden death as steeplejacks. They're in the 11th spot.

Dynamite is not nearly so erratic as nitro, but any guy who fools around with stuff that goes boom in a large way isn't regarded favorably by insurance companies and that's why blasters win a place. They're 12th.

Here is how one major life insurance company rates your job according to the risks involved.

Five-Year Advance—Abrasive industry foremen; horse racing handicappers; asbestos plant workmen; button workmen; ball, tube and hammer millers in the cement, lime and gypsum industry; coke workmen; employes who enter storage rooms in cold storage plants; can washers and cold-room workers in dairy products plants; drum or tank cleaners in dry cleaning plants; embalmers; exterminators and fumigators; workmen in fish curing and packing plants; porters in hospitals, asylums and sanitariums; bellboys; dishwashers; peddlers; janitors; rug cleaners and repairers.

Eight-Year Advance—Laborers in alcohol manufacturing plants; dance hall keepers; race track keepers; workmen in aniline manufacture; burners; casters; molders; scrapers; solderers and trimmers in battery manufacture and repair companies; bag-wheel attendants; coal driers and grinders; gyratory crushermen; packers and sorters in cement, lime and gypsum plants; back shop workmen in felt hat-making plants.

Ten-Year Advance—Workmen in abrasive plants; asbestos plant laborers; bootblacks; glaze mixers in brick and tile works; cotton-gin mill laborers; harvesters and laborers in the ice industry; chauffeurs; deliverymen; drivers and truck helpers in the liquor industry; match industry laborers; shavers, skinners and other slaughter house workers; blacksmiths; carpenters; electricians; machinists; ore samplers and weighers in the mining industry.

Twelve-Year Advance—Bicyclists; mixers and pasters in battery manufacture and repair plants; burners, dusters, furnacemen, mixers and sprayers in the enameling industry; laborers in glue plants; knockers and yardmen in the meat industry; metal plant chippers; casters, founders and molders in brass, bronze, lead and zinc factories. •

Ride this great new

MODEL K

for amazing speed, breathtaking thrills, sensational fun and excitement!

TWIST the throttle on a Harley-Davidson Model K and get set for a spine-tingling, thrill-packed ride. Make the dirt fly with the motorcycling gang at field meets, club events and endurance runs. You'll like the cushioned comfort that's assured by the new swinging arm rear suspension, hydraulic telescopic fork and foam rubber saddle mounted on floating twin seat posts. And as for speed, count on the dependable 45 cu. in. twin engine to help you crack records wherever you go.

Try a ride at your Harley-Davidson dealer's today. Bring a buddy along. Or send 25¢ for illustrated literature and a copy of the Enthusiast magazine, filled with exciting stories. Harley-Davidson Motor Co., Dept. MI, Milwaukee 1, Wis.

HARLEY-DAVIDSON

MODEL K

NOW! SAVE GAS, CUT REPAIRS *as you drive!*

New STEWART-WARNER *"Custom"* MOTOR® MINDER

Gives Constant Check on Engine Performance

A quick look at its illuminated dial shows the way to peak motor performance. Lets you see at a glance how to get most miles per gallon—warns of engine trouble, of sub-standard performance by spark plugs, carburetor, valves, timing, rings, manifold and muffler, etc.

"Custom" model Motor Minder is easily, quickly installed in any car or truck. Swivel mounting for all angle vision. No extra parts needed. Complete instructions for installation and use included.

Motor Minder gives a constant visual check on *all* car motors—even latest high-compression models. Exceedingly accurate. Only $10.95. Install *your* Stewart-Warner "Custom" Motor Minder—today!

Ask for it at your Dealer's—only **$10.95** *Or Write:*

STEWART-WARNER

Instrument Division, Department V-23
1840 Diversey Parkway, Chicago 14, Illinois

Stage, Screen ... Jungle

[*Continued from page* 104]

Jackie, for he's that roaring MGM trademark lion you see in technicolor. Jackie starred in 510 films. In fact, any time you saw a lion leap on a man in a jungle film, that was Jackie and his trainer since birth, Melvin Koontz, who has doubled for more actors during the last 20 years than he can remember.

Not so long ago Old Jackie went to his Valhalla but Melvin has trained another Jackie. Many were tried and after months of patient training none qualified until last year. The process usually begins at three weeks old, when he starts wrestling with the cub. If the animal doesn't learn to suppress its claws, as well as its jaws, it can be dangerous and is rejected.

Richards points out that training lions and other big cats for the movies is vastly different than for the circus. For the latter, they are trained by force to do certain routines. If anything goes wrong or the routine is disturbed, they become confused and uncontrollable.

Should a movie studio use circus cats for a jungle film, it might find that the trainer could put them through only their routine tricks of assuming those certain positions they had been trained to take instead of charging, attacking, stalking, leaping and wrestling as the script might call for and which the Compound cat actors professionally perform.

Koontz' most hazardous adventure came when he was 19, three years after Richards employed him. He foolishly thought he could break three two-year-old tigers at one time. They were put into the cage with him and before he realized what was happening, the trio charged him simultaneously. Another trainer in the outer cage swung open the door and no sooner had Koontz swished through it than he slammed it shut on the tigers. A second's delay and he would have been torn to pieces.

As for his most humiliating experience, it occurred back in 1949 when he volunteered to help unload some wild horses from the butcher truck. The Compound does its own butchering, using 1,000 pounds of meat every week. As he assisted in getting them off of the truck, one leaped on him, struck him down and kicked him. The diagnosis at the hospital showed a broken leg and severely lacerated jaw. When he was able to see visitors and was asked, "How's your leg, Melvin?" he grinned:

"It's not my leg that hurts; it's my pride. Here all these years I have handled the big cats and then, by golly, I can't side step an old horse." •

Texaco Tips

on car care

How to get longer battery life

Corrosion and insufficient fluid are two of the most common causes of battery failure. So, for longer trouble-free battery life, see your Texaco Dealer. He will check the fluid level — add water whenever necessary. He will remove all terminal corrosion and test your battery for any weak cells—recharging it if necessary.

How to get that "cushiony" ride

This "stretch test" shows why Marfak protects your car's chassis longer. An ordinary grease would fall apart. But Marfak is extra-tough! It stretches without falling apart! That means it resists jar-out, wash-out and squeeze-out. And for you, Marfak's tough protection means cushiony smooth motoring — for 1,000 miles or more! Get Marfak lubrication today. See your Texaco Dealer, the best friend your car ever had.

MARFAK Lubrication

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THAT "CUSHIONY" FEELING LASTS LONGER WITH

THE TEXAS COMPANY

TEXACO DEALERS IN ALL 48 STATES

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DREMEL MFG. CO. Dept. 143-B RACINE, WIS.

Is Your Lens Sharp?

[*Continued from page* 145]

during print exposure. Any one of these factors, are more likely suspects than the camera lens.

But after investigating these possibilities, if the photographer still doubts his lens, a simple bench test is in order. The only equipment required for this test is a one-foot white plastic ruler scaled in millimeters and inches, a photoflood bulb in a reflector, a pair of calipers, a small pen-type or regulation microscope that will magnify from 30 to 40 times, and a small piece of ground glass (unless the camera is of the ground glass focusing type).

First, hang the ruler in a vertical position about 15 ft. from the camera and center it in the beam of a floodlight or spotlight. Do not allow light from the lamp to shine in the camera's direction. Next, focus the ruler on the ground glass. (On cameras without ground glass focusing, open the back, remove the film, and hold the ground glass in the film plane.)

Use the calipers to measure the exact length of the ruler's image. Do this carefully as results are predicated on this image length. Next, remove the ground glass and point the microscope through the lens at the ruler. Move it slowly back and forth until it picks up the air-suspended image of the ruler. The microscope should be on a support.

Study this image carefully. Note whether or not the scale divisions on the ruler are sharply defined and divided. If they are, move the ruler a bit further away, measure its image on the ground glass, and again study the image with the microscope. Keep moving the ruler further from the camera until the divisions on the millimeter scale begin to blur together. This means that the maximum resolving power of the lens has been reached.

Only simple mathematics are required to calculate what this resolving power is in lines per inch and per millimeter. There are about 300 millimeter scale divisions on a one-foot ruler. As long as these divisions are visible through the microscope, it means that the lens is resolving 300 lines in a space equal to the measured length of the ruler's image on the ground glass.

As a practical example, suppose the ruler's image length on the ground glass is ⅛ in. when maximum lens resolving power is reached. This means that the lens is resolving 300 lines in each ⅛ in. of distance. In a full inch, the resolving power would be 8x300 lines, or 2,400 lines per inch.

The test may be repeated with the ruler on different sections of the ground glass to determine the over-all sharpness. •

The Blowtorch

[*Continued from page* 130]

that must be covered with the thumb to prevent over-pumping. Always follow the manufacturer's instruction leaflet for best results.

In preparation for lighting the blowtorch, about five to ten strokes of the pump are all that should be necessary at the start to get enough air pressure in the tank if the pump is in proper working order. As soon as the needle valve is opened slightly, raw gas will shoot out of the burner. By placing your hand in front of the opening, this gas will be directed down into the priming cup. When the cup is about three-fourths full, the needle valve should be closed and all traces of spilled gas wiped off. The burner is now preheated by igniting the fuel in the priming cup.

The needle valve should be opened slightly to ignite the burner just before all of the fuel in the priming cup is consumed. If this point is missed, it is a simple matter to hold the flame from a match under the holes in the burner. A pale blue flame indicates that the burner has been preheated properly. A yellow, dead flame means that the burner should be allowed to cool, then preheated all over again.

It is extremely dangerous to attempt to refill a hot priming cup. If you use the torch indoors, remember that as it burns it gives off poisonous carbon monoxide gas, so good ventilation is necessary.

The size of the flame is regulated according to the job to be done by opening or closing the needle valve. This flame will be maintained if pressure is kept fairly uniform by an occasional few strokes of the pump. Care should be exercised not to over-pump, as too much pressure is not desirable. In fact, a low pressure is considered better if the flame is small. (See drawings for a complete outline of the lighting and flame regulating procedure.)

Recently a new type of torch (or a modification of an existing one) came on the market, one with a disposable fuel tank. This type is light in weight and is less than a foot in length, making it small enough to fit in almost any tool box.

To use, just open the valve and put a match to it. The wider you open the valve, the hotter the flame. This adjustable, instant flame is said to heat up to at least 2200 degrees, which is hot enough for silver soldering. It may be used in any position, even upside down. Attachments are available to make this torch suitable for general use, for jobs requiring a narrow pointed flame and for paint-burning jobs. •

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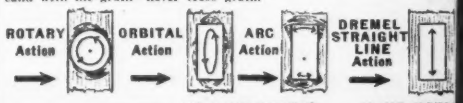
EASY, ONE-HAND OPERATION less tiring on vertical and overhead operations. Sands into corners—other tight places.

TROUBLE-FREE USE assured. Only two moving parts; never needs oiling. No armatures, brushes, gears or bearings to wear out and replace.

Professional Model 2000 is a favorite with carpenters, painters, contractors and family handymen! Ideal for finish sanding on flush doors, panelling, cabinets, etc. Superb for waxing cars, polishing furniture, etc.

A "must" for dry-wall joints. Sands into tight corners. Ideal for refinishing.

TRY THIS SIMPLE TEST: Sand a piece of wood by hand, using the four motions below. Note slightest cross-grain action produces scratches and swirl marks. Sanding **with-the-grain** gives scratch-free satin finish. This test proves conclusively why professional craftsmen always sand with-the-grain—never cross grain.



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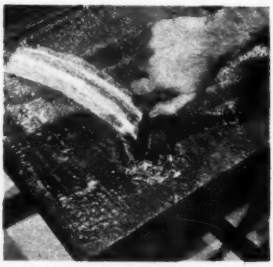
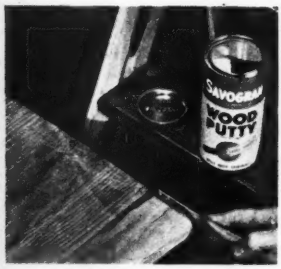
ELECTRIC DREMEL POWER TOOLS

How to Get Smoother, Slicker Paint Jobs



Step 1. *Prepare surface.* Remove all chipped and peeling paint or varnish down to bare wood. You can do this easily and quickly with Strypeeze . . . the *guaranteed* paint remover that stays wet longer, clings to upright surfaces, doesn't harm hands.



Step 2. *Rebuild broken corners, fill nicks and holes.* A powder-form plastic putty, Savogran Wood Putty, is ideal for this. You can form it, tool it . . . and it doesn't shrink. For cracks in plaster, use Savogran Crack Filler. It's the original patented quick-hardening water putty.

Step 3. *Start job with clean brushes.* If it's an old brush, clean it before you begin painting. Clean all brushes after painting and whenever you change colors. Kwikeeze, the Liquid Brush Cleaner, softens *hard* brushes in minutes . . . cleans out fresh paint instantly! May be reused.

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On Trail Of Cottontail

[*Continued from page* 100]

talk with Beller's previous owner who pointed out that he had never said the dog would run rabbits through briars.

"I knew he wouldn't," the man very reasonably explained, "so I didn't discuss the matter. If he hadn't had a fear of briars you never would have bought him that cheap."

It required considerable effort to break Beller of this aversion to thorny growth, and it was accomplished through considerable wear and tear on hunting clothing. When the hound paused on the fringe of a briar patch I would pick him up, carry him to the center of this patch and deposit him there. He either had to work his way out or die of starvation. In the process of time and at the cost of several pairs of trousers, he caught on and we enjoyed many years of hunting together before he ascended to that happy hunting ground where rabbits were on every hand and briars had no thorns.

The tendency of the rabbit to return to the place where he was "jumped" regardless of how far and how hotly pursued has provided the major ingredient for countless millions of rabbit stews. If the hound is close on his heels, Brer rabbit may not pause at this spot, but you can depend on one thing—he'll pass within a few feet of it. If you miss him with both barrels, just wait till he passes again the next time around. Rabbit hunting, to a poor shot, is merely a matter of patience and practice, provided the hound doesn't get fed up and decide to find another rabbit.

In many areas where the winter hunting of rabbits provides the major outdoor activity of the sportsman, the rifle is substituted for the shotgun as a sporting gesture. It is more difficult to knock over a running rabbit with a .22 bullet than with a load of No. 6 shot, although the shooting is more open with a blanket of snow on the ground.

The tendency of the rabbit to get a good lead on the hounds then pause to rest often simplifies the task of those who use the .22, and it is not always necessary to depend on having to make good on running shots at these targets.

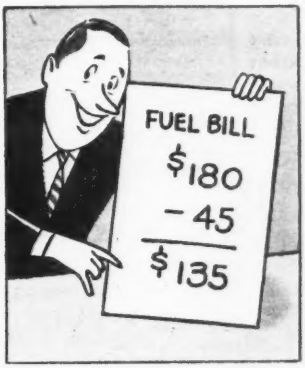
Some hunters who have failed to try rabbit hunting argue that they would like to add it to the list but are afraid of tularemia or rabbit fever. Actually, this danger is exaggerated. In the first place, there have been few recorded cases of tularemia and so far as I know there has never been a single case north of Connecticut. In the warmer zones, where there is a faint possibility of infected game, normal percautions can abolish all

[*Continued on page* 173]

Let's insulate the attic next Saturday afternoon!

IT'S EASIER THAN YOU THINK—WITH GOLD BOND ROCK WOOL!

Why try to heat all outdoors? You can keep furnace heat in by putting fireproof Gold Bond Rock Wool in your attic. Cooler in summer, too.

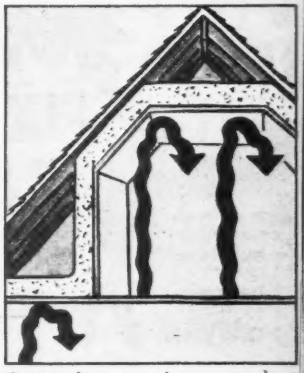


Actual tests show insulating the attic can cut fuel bills up to 25%. Savings soon pay the low cost of Gold Bond Rock Wool. All you "spend" is time!

See your Gold Bond lumber and building material dealer. He'll give you printed, easy-to-follow instructions... easy payment terms if you wish.

Start by laying Gold Bond Blankets between floor joists. Blankets come 15", 19" or 23" wide to fit most floors. Keep the "vapor barrier" face down.

If attic already has a floor, you nail or staple blankets to the kneewall and ceiling framing. Your Gold Bond dealer will furnish you a stapler.



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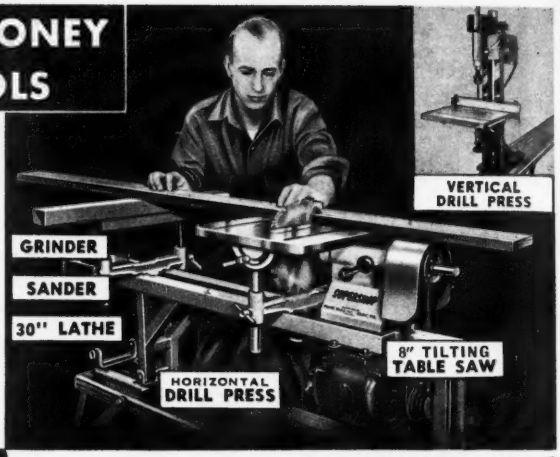

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Division of Sandvik Steel, Inc.
47 WARREN ST., NEW YORK 7, N. Y.

On Trail Of Cottontail

[*Continued from page* 170]

danger. Usually an infected rabbit can be determined immediately for it is extremely sluggish and will run slowly and only for a short distance. Such rabbits should be shot and not touched, in order to prevent the possibility of spreading infection. However the rabbit can be handled with gloves without danger, even if it happens to be infected. Even an animal that is fatally diseased will not transmit the disease after cooking. I have hunted rabbits in more than a dozen states and have met more than a thousand rabbit hunters. Among them all, I have never met one who knew of one person who had contracted tularemia.

It has always annoyed me to hear some lordly bird shooters scorn the rabbit enthusiast as a sportsman of lower caste. Sportsmanship is without boundaries as to the species of game and is regulated by the conduct of the individual rather than the game he hunts. Rabbit hunters embrace every class on the social scale and the sport has the advantage of being open to everyone and can be practiced at less cost than any other form of hunting. A gun and a few shells, coupled with the desire to tramp the woods and fields, is all that is necessary to qualify any individual as a rabbit hunter. His personal conduct determines whether or not he is a sportsman.

Many years ago I ran into an old-timer who claimed to own the "greatest meat-hound alive." This dog, it seems, would run nothing but rabbits by day and nothing but coons by night. And he was "sure death" on the track of either.

"Only saw him fooled once," the proud owner explained. "I was rabbit hunting one cloudy, dark afternoon on the fringe of a deep cedar swamp. We jumped a rabbit and the hound ran him so hot the rabbit took to the swamp. Once he got deep in the swamp it got so dark the dog quit running the rabbit and took up a coon track, thinking it was night. He sure looked silly when the coon climbed a tree on the very edge of the swamp and he saw it was still day. The only time he was ever fooled. After that, when a rabbit ran in a swamp, I'd see that dog look at the sun to be sure he'd have time to run the rabbit back before dark."

You may not get a chance to shoot over a dog that smart, but the next time someone invites you to hunt rabbits, give it a try. The following week you'll be able to find someone with a hound for sale without too much trouble. But don't make the mistake I did. Try him out in a country where there are briars. •

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MOORE MANUFACTURING CO.
SWEDESBORO 3 NEW JERSEY

The English Morgan

[*Continued from page* 90]

are meant to be used to get the most out of the car. Of course he is right but as a test it does show the tremendous dig of the Morgan and this should appeal especially to the non-competitive sports car fan who likes Detroit torque in a sports car chassis. For this man it should also be noted that the Morgan is a very superior traffic car and will not let him down in green light contests.

As already pointed out, due to its engine size the Morgan is a comparative dud except in rallies or small hill climbs. At big hill climbs which attract a better and larger group of competitors, the Morgan would be creamed by Astons and even 1½-liter Porsches. This brings us back to the question: what has the Morgan got and is it worth it?

SPECIFICATIONS

MODEL TESTED:
1953 Morgan Plus Four two-seater

ENGINE:
4 cylinder, bore 3.347 inches, stroke 3.622 inches; piston displacement 127.6 cubic inches; brake horsepower 68 @ 4200 rpm; compression ratio 6.7 to 1

DIMENSIONS:
Wheelbase 96 inches; overall length 140 inches; tread 45 inches front, 45 rear; width 56 inches; height 52 inches; weight 1,500 pounds; standard tire size 5.25x16; gas tank 14 gals

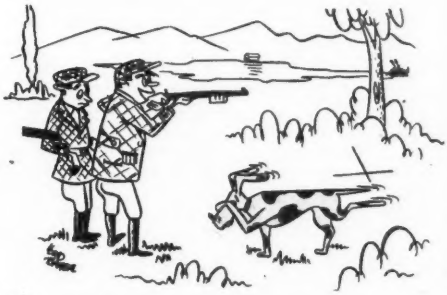
PERFORMANCE:
0 to 30 mph, 4.5 seconds
0 to 50 mph, 11.9 seconds
0 to 60 mph, 15.7 seconds
0 to 70 mph, 28.3 seconds
Top speed, 82-84 mph

SPEEDOMETER ERROR:
At 60 mph on speedometer, actual speed 58.82 mph

As I mentioned at the beginning, the Morgan is really a snob's MG. As an MG owner I feel other MG owners will bear me out in this. When you roll up to a gas pump in East Thumbtack, Tennessee, or Broken Bottle, New Mexico, the MG owner gets a big bang out of the natives' interest in and comments about his little jewel. How fast will it go, how much did it cost and where was it built?

Around the big metropolitan centers such as New York, MG's are now as common as flat-footed cops and at big sports car meets they get as thick as horseflies around a stable in August. Here the Morgan is rare enough to excite lots of attention, even in sports car groups, giving the owner a lot of pride of possession pleasure if that's what he's after. Actually, I rate my MG Mark 2 a much better all-around automobile, especially in the quality and detail department. It has better instruments, a better ride and is a lot more comfortable to drive. It has more elbow room, due principally to its adjustable steering wheel, and the general appointments seem to be more professionally built. On a coast-to-coast trip I feel my MG would be more comfortable by far but when I got to the mountains I'd like to have some of that Morgan dig. The MG's rack-and-pinion steering is much surer and less tiring on long stretches but at the traffic lights, when some schmoe in a hot rod gives you the bird, the Morgan would be nicer to own.

But sports car men come in many sizes and shapes and sometimes with odd turns of mind. Take comfort, for example. I have driven Ferraris costing five times the price of a Morgan that were not as comfortable as my MG. The Ferrari buyer was not after comfort but after superb performance, which he certainly got by the boatload. The Morgan is a connoisseur's or possibly a collector's car. It's different and will be a good talking piece 25 years from now. There is a rumor afoot that the Morgan people may build a car with a high performance engine under two liters, in order to qualify for more contests. But as this goes to press, Joe Ferguson can sell all the Morgans he can lay his hands on—so who knows when and if the power change will be made? For less than $3,000 the Morgan owner gets one of the best-looking classic sports cars on the road. It's unusual and still quite rare on these shores. But I'll stick to my Mark 2 MG.—*Tom McCahill* •



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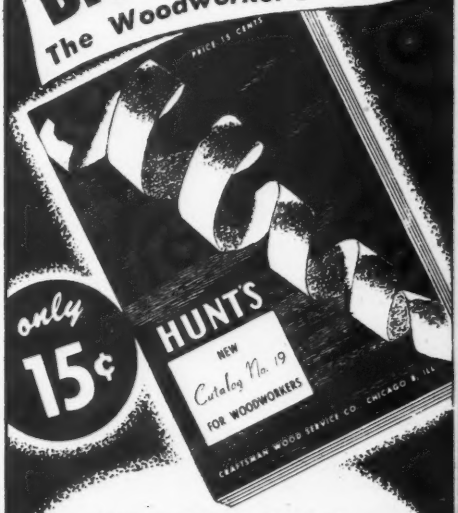

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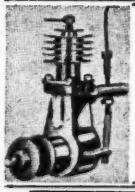

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MI Tests Buick

[*Continued from page* 86]

increased horsepower, remains very much the same as before and uses its same straight-8 overhead-valve engine. Undoubtedly, the V8 of the Roadmaster this year will be adopted to the smaller model Special next year.

By now I can feel the real automotive reader seething and saying to himself, "Come on, Baldy, tell us how the Roadmaster handles and does it have power steering?" First, the car I tested had power steering. The GM power steering, unlike the Chrysler variety, requires a four-pound wheel pressure before it responds. This gives you a little more road feel, which is desirable, but frankly I was unimpressed. My Mark VII Jaguar without power steering handles and steers easier than the Buick with power steering except for real standing-still turning. It is all a question of balance. If cars are built with balance and correct weight distribution in the first place, there is very little need for power steering except to overcome the silly drag of the super balloon tires.

As for handling. . . . I drove this test car from Flint to the GM proving grounds and on the way had several opportunities to try it out with semi-fast turns on regular country roads. I found the rear breaking away on gravel and dust with the agility of an acrobat and for me it rolled too much on hard surface turns. This is not the car I would select to try and control in a 60-mile-an-hour spin or slide. As long as we are going back to the 12-volt system, why not go back to the old-fashioned ride control—if we must build cars for Madame Suburbia? She could then have her down-pillow ride over the local pot holes and the old man could have a firmer, safer ride for high-speed turnpike travel just by turning a knob on the instrument panel which would harden up the shocks.

As for the horsepower race. . . . Buick's new engine, developing 188 horsepower, is the reason for the very high turn of speed. Using Low and Drive of the Dynaflow transmission, zero to 60 proved a brilliant 13.6, a new record for Buicks. In Drive all the way, 15.9 seconds was the average. Now this is a long way from an MI record but it is very fast just the same and when compared to the 1952 Buick's 150-hp zero-to-60 of 14.6 in Low and Drive, and 18.5 in Drive all the way, it shows quite an improvement for which the new turbine blade can share some of the credit. Using the faster Low and Drive, the difference of exactly one second doesn't seem so much from 1952. This year's new Roadmaster takes five

[*Continued on page* 179]

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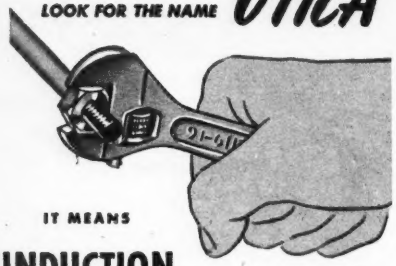

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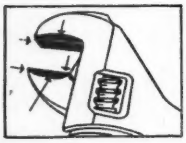
Ordinary adjustable wrenches, subject to hard usage, burr over at the jaw edges. UTICA's process hardens the jaws in just these *vital* areas (indicated by arrows). Tests show that UTICA's last up to 10 times as long as ordinary adjustable wrenches.



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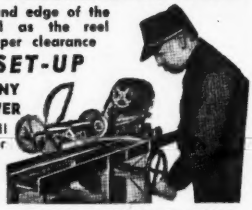

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Ask for it at your Dealer

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MI Tests Buick

[*Continued from page* 177]

seconds flat to get to 30 miles an hour in Low; last year's '52 took 5.8. The '53 Roadmaster is a good six and a half miles faster at top speed so the real big gain would appear to be in the top speed department, which brings me to a point about the horsepower race.

A few weeks ago I was having lunch with the chief engineer of one of our major companies when the subject came up. Without mentioning his name, I'll quote him as closely as I can remember.

"You know, Tom," he said, "all this horsepower talk is a lot of nonsense. Though he doesn't know it, what the average buyer really wants is torque, not developed horsepower. They've stressed the horsepower malarky so much that by now Mister Average is completely confused. Developed horsepower only pays off at close to top engine rpm or in fast cars in speeds above 90. The normal, intelligent driver doesn't want this at all but he's been led to think that unless he buys a car with tremendous horsepower, he's driving an old maid's hack.

SPECIFICATIONS

MODEL TESTED:
1953 Buick Roadmaster four-door sedan

ENGINE:
V8 cylinder, OHV; bore 4 inches, stroke 3.2 inches; maximum torque 300 foot pounds @ 2400 rpm; piston displacement 322 cubic inches; brake horsepower 188 @ 4000 rpm; compression ratio 8.5 to 1

DIMENSIONS:
Wheelbase 125.5 inches; overall length 211.6 inches; tread 60 inches front, 62.2 rear; width 79.9 inches; height 63 inches; weight 4,089 pounds; standard tire size 8.00x15; gas tank 19 gals

PERFORMANCE:
0 to 30 mph, 5 seconds (Low all the way)
0 to 60 mph, 15.9 seconds (Drive all the way)
0 to 60 mph, 13.6 seconds (Using Low and Drive)
0 to 70 mph, 17.5 seconds (Using Low and Drive)
Top speed, 103.4 mph

SPEEDOMETER ERROR:
At 60 mph on speedometer, actual speed 56 mph

[*Continued on page* 181]

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FRANKLIN
Liquid Hide
GLUE
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Genuine
HIDE GLUE
*** STRONGEST — most permanent results.**

Franklin Glue holds more than two tons per square inch—stronger than the wood itself—insures lasting joints that really hold.

use right out of the can
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Franklin Glue is genuine hide glue, favorite of the old-time craftsmen, but easy and ready to use. No heating, mixing, or odor. The choice of fine craftsmen everywhere.

Get it in tube, 2 oz., ¼ pt., ½ pt., pints, quarts or gallon sizes.

A trial tube will convince you. If your dealer does not have this size, write direct. Send 20c — 15c for glue plus 5c for packing and postage.

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THE IRON REPAIR CEMENT OF MANY USES

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99c Profit On Each Dollar!

It costs less than 1c per mower for electricity and material. The Foley sharpens all blades and cutter bar together **just like lawn mower manufacturers do it.** Start in spare time in basement or garage. The Foley handles up to 3 or 4 mowers per hour—prices run $1.50 to $3.00 for hand mowers—$5.00 to $8.00 for power mowers.

FREE—VALUABLE ILLUSTRATED BOOK shows how to sharpen all leading makes of power mowers. Foley prices are low—easy payments available. FREE PLAN tells how to start. Send coupon today—no salesman will call.

"Last year we sharpened and repaired about 1000 lawn mowers for a net profit of $2,600", says E. G. "In 1939 I bought a Foley Lawn Mower Sharpener," writes W. T. J., "the best investment I ever made. I have made a good living for my wife and myself, and have put money in the bank besides."

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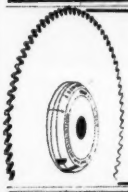

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MI Tests Buick

[*Continued from page* 179]

"What he really wants is high low-speed torque, the only real power that can build up quick inertia from a standstill. Torque provides the initial forward thrust, it is the actual power that turns the wheels against a load. Developed high horsepower is rarely ever needed, or really desired, but torque doesn't seem to have the glamour sound to the public. From an engineering standpoint, we could build a car developing 25 horsepower less than at present and still beat every American car on the road in acceleration and punch up to 80 miles an hour. It would have twice the emergency jump in tight spots and handle much easier in traffic than our current models. In other words, it would have true performance."

I couldn't help thinking of my low power, low torque, low everything MG. MG's are notoriously poor on steep hill climbs but recently, in a match race against a Hudson Hornet with Hydramatic on my one mile and a quarter hill climb, my Mark 2 beat the tar out of this hot shot which, believe me, made the owner very unhappy. The reason was that on this particular climb there are two sharp turns. The hill is so pitched that the Hornet couldn't build up any speed in top gear and when the turns were reached, it was forced to cut down to 50 miles an hour. The MG took these turns at about 58.

I kept it in third gear all the way, clearing the top at 65 miles an hour. The pitch was too steep for the Hudson to make any speed in top gear and the low end of top was just too slow to beat the MG after reducing speed for the turns. The almost zero-torque MG won—first, due to the transmission of its opponent and, second, because the Hornet just couldn't corner with the MG. My engineer friend's hypothetical car, however, would have murdered me and I would have been the sad sack against that kind of performance.

To get back to Buick, this year's Roadmaster with its simulated wire wheels still retains the traditional Fisher body look of high hood line and bulbous end view. It has fine straight line road shock quality and in the road shock absorption department it must be rated with the best. The Dynaflow transmission has been improved and the general straight line performance is really top flight. This is a luxurious car with excellent accessories such as the heater and radio. Buicks hold their resale value better than most cars in their class, which makes them an excellent financial risk. If you are a Buick man I say, "Here's your dish, the best Buick built since the war." •

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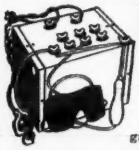
How to Make Your Own Lie Detector



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Complete with everything. Ready to plug in. 110 volts A.C., 15-30 amps. 3 heats. Welds metal from 1/16" to 1/4" using 1/16" to 3/32" standard rods. Guaranteed unconditionally. 10-day trial. No C.O.D. We also make welder for 16-22 gauge metal, $3.95; 1/8" metal $6.45.

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MIDGET MOTORS MFG. CO., ATHENS, OHIO

Be A Memory Wizard

[*Continued from page* 82]

Summer, had a high old time and then came home with the uneasy feeling that he had forgotten something important? When he arrived, he learned what it was. It was his son.

Or is it as good as that of Robert Nestler, a bedspread salesman? When a catalogue containing 73 new designs, each with style number and price, was sent to his firm's New York office, Nestler memorized it page by page. Not long after, the actual spreads arrived. With the boss and entire staff present to view the line, Nestler quoted all details without consulting the book. Result: he was promoted to sales manager with a large raise.

Or as good as the manager of a large resort hotel? He has earned immeasurable good will by remembering not only all the names of his guests, but their room numbers and the special services they demand as well.

Or as good as the advertising solicitor for a large major eastern newspaper? He can quote all the rates and discounts of his publication without referring to a rate card, a feat no one else has been able to duplicate. That's not all—he knows the rates of all his competitors as well.

Chances are the answer is "no." But you can reach these amazing levels of retention. Listen:

Last fall, the School of Memory and Concentration, of which the fabulous Dr. Bruno Furst is founder and director, held graduation exercises in New York. More than 250 students had completed a ten-week course at Steinway Hall. Before starting their studies, they were a typical forgetful lot—stuffing memos in their pockets to remind them to do things, then forgetting about the memos; slipping up on half the things they were supposed to do on a given day because of faulty memory; going out to the store for a dozen eggs and a half-dozen rolls and coming back with a half-dozen eggs and a dozen rolls. They were a cross-section of all fields of endeavor, absent-minded as most of us.

But this is what happened at graduation:

Dr. Furst asked 40 persons in the audience to rise and give their names as the graduates on the stage listened intently. After the fortieth had sat down, Dr. Furst called on one student. Without hesitating, he pointed to each of the persons who had called out his name, and identified him. Many other students performed the same stunt. And here's the clincher—an hour later, the students were able to pick out each of the 40 by name once again, proving that the names had stuck!

Then Dr. Furst distributed copies of a mag-

[*Continued on page* 185]

BE YOUR OWN BOSS! Men who are determined to get ahead in something for themselves will find this opportunity hard to beat! Where else can a man turn his own labor so quickly and easily into BIG MONEY! Earn as high as $50 and more a day sanding floors with an easy-to-run American Machine—and YOU ARE BOSS. Prospects everywhere—old and new homes and remodeling. Pleasant indoor work—steady the year round. No schooling — no experience needed. Age makes no difference—men 18 to 80 are active and successful. Send coupon for "money-making" booklet entitled "Opportunities in Floor Surfacing"—enclose 25c in coin or stamps to cover handling.

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With the high prices of food, clothing, etc., just think what you could do with extra money! Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to $3 or $4 an hour. Start at home—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No Canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. With a Foley you can file all hand, band and cross-cut circular saws.

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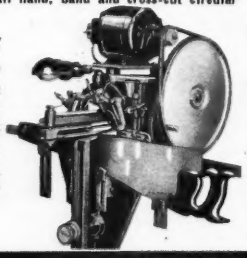
Shows How to Start

It explains how you can get business from home owners, farmers, carpenters, schools, factories, etc. "I get work from 20 and 30 miles away"—says Charles H. Smith. Free Book "MONEY MAKING FACTS" tells just how to start. Send coupon today—no salesman will call.



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Foley Mfg. Co., 215-3 Foley Bldg., Minneapolis 18, Minn.
Send Free Book—"MONEY MAKING FACTS"

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Address .....

Getting The Most Out of Your BAND SAW or SCROLL SAW

This fine book—"Getting the Most Out of Your Band Saw and Scroll Saw"—is packed with the "know-how" of Delta experts. Dozens of practical tips on how to make your tools *last longer*, stay accurate. Only 25c postpaid—saves you dollars a-plenty. Send 25c in coin (no stamps) to *Delta Power Tool Division, Rockwell Mfg. Co., 5128 N. Lexington Ave., Pittsburgh 8, Pa.*

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The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

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No. I- 30 Hobbyist assortment of six small magnets	$ 1.50

Send Money Order or Check. We pay postage. No C.O.D.'s.

MIAMI MAGNET COMPANY 3240 N. W. 27th Ave. MIAMI 42, FLA.

Be A Memory Wizard

[*Continued from page* 183]

azine to the audience and announced that the night before about a dozen students had been asked to memorize it cover to cover. "Ask them what's on what page," the doctor urged. The spectators did and were astounded, because the students came right back with accurate descriptions of advertisements, including details of the products and a summary of the written texts.

There was more. A deck of cards was dealt out. Three persons read off what they held in their hands while the fourth hand was placed face down. Students selected at random were able to read off the missing hand—because as the others were read off, they had memorized the cards and were able to tell what had been left out.

How did they do it? The answer, says Dr. Furst, lies in training—training coupled with mastery of a set of systems.

First, you must realize one essential thing in remembering: when you hang your hat, you put it on a hook. When you want to remember important things, you also put them on hooks. You establish a series of hooks in your mind and when you want to pluck something from the recesses of your mind, you find the hook and take it off.

Let's take figures. They stump nearly everybody, although they are vital in almost every walk of life. Dr. Furst has figured out a method of remembering figures which is basically the substitution of words for numbers. He has evolved the following numerical code:

1	2	3	4	5	6	7	8	9	0
t	n	m	r	l	j	k	f	p	z

All vowels are omitted and all consonants that sound alike are considered identical. For example, t can also be a d or th. An f can also be v and ph. A j can also be ch, sh or a soft g, as in the word general.

How is this code applied? How, for instance, can it help you to remember such things as the temperature at which copper melts or the year George Washington was born and the year he died?

You manufacture hooks for yourself—make up words or phrases about the thing you want to plant in your memory. This mental picture will at once flash the right answer into your mind. Here's how it works:

The melting point of copper is 1981 degrees Fahrenheit. To fix it in your mind, make up any set of words beginning with the correct letters—the letters t, p, f and t or d. How about

[*Continued on page* 187]

Archer
Pol-mer-ik
LINSEED OIL

PROTECTS MOST ANYTHING

A few of its 101 HANDY USES:

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- Preserving paint brushes.
- Protecting gun stocks.
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Yes, Archer Pol-mer-ik is a real Handy-Andy oil that saves you time and money by doing the job of a dozen more expensive specialized products. You'll find it's the handiest single product in your house!

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For years Archer Pol-mer-ik has been the choice of professional painters for paint reducing and brush conditioning. Pol-mer-ik is given a special polymerization process which rearranges and locks together the oil molecules. This process gives you a tougher, more durable paint film than ordinary linseed oil. When you reduce your paints with Pol-mer-ik, they brush out easier, level better, have a smoother surface that collects less dirt, and give you a longer-lasting job! Whenever you paint, use Archer Pol-mer-ik Linseed Oil for better results!

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FREE BOOK TELLS HOW

You can start this REPEAT CASH business in your own home or garage, while you are working at your regular job. Easy to operate, no experience needed. "Pays for itself from just 65 saw jobs."—*Harvey Jensen.*

For as little as $15 down payment, you can get your BELSAW CIRCULAR SAW SHOP rushed to you.

You can make $4 to $5 an hour in your SPARE TIME sharpening and setting CIRCULAR SAWS for builders, lumber yards, factories...No *Extra* Equipment needed, no canvassing. Send postcard today for your *Free* copy of "Life Time Security."

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2 h. p. (as shown) only $134.

Useful All Year Around
Complete Interchangeability

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ORIGINATORS of:

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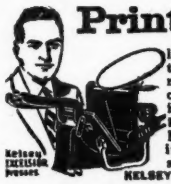

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AMERICAN FARM MACHINERY COMPANY
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Be A Memory Wizard

[*Continued from page* 185]

"ten pennies for a dime?" Long afterward, when you have occasion to remember the figure, that phrase will pop into your mind—then all you do is translate it into figures: t is l, p is 9, f is 8 and d is 1 again.

George Washington was born in 1732 and died in 1799. How about the phrase, "mourn now president's passing?" The m and n give you 32 and the double p gives you 99. You supply the century.

If you want to remember addresses, telephone numbers, catalogue references, any figure at all, apply the code. It works every time. It works because a mental picture is better than innumerable repetitions.

Suppose you want to remember a half dozen things you have to do on a particular day. Dr. Furst teaches his students what he calls a basic list of 100 words. This list is specifically based upon the numbers code. For instance the first word is tea, because one stands for t; the second is Noah, for n; the third is May for m; the fourth ray for r; the fifth law for l; the sixth jaw for j; the seventh key for k; the eighth fee for f; the ninth bay for b. Now the words that follow are simply combinations of the same numbers—57 is lake, which is merely a combination of l for 5 and k for 7; 89 is fob, combining f for 8 and b for 9.

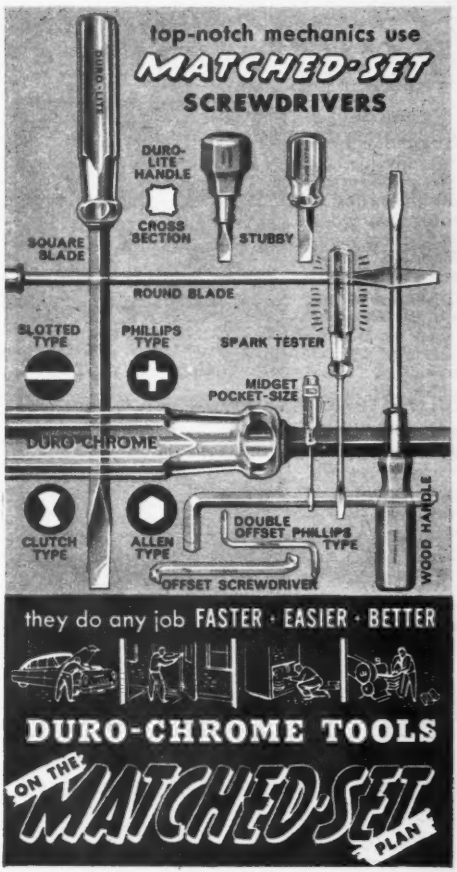
How does *this* work? Suppose you have that list of a half dozen things to do—you have to meet someone at Jones' department store, buy some film, get the car fixed, go to the dentist, telephone the caterer and pick up the meat for dinner.

Start making mental pictures, using the basic words. Picture yourself having a cup of *tea* at Jones' store, *Noah* taking pictures on the ark, driving the car on a pleasant *May* day, the dentist taking a sunbath under the *ray* of a lamp, the caterer in the arms of the *law* and chewing meat with your *jaw*. It doesn't matter how silly the mental images are.

Now—you are in the city and you ask yourself: what's the first thing I have to do? You know that the first word in the basic list is tea. At once the picture of yourself having tea at the department store swims into your mind and you remember your appointment there.

Afterward, you ask yourself: "What on earth is the second thing I'm supposed to do?" You know the second basic word is Noah; again your mental magic lantern flashes you an image, this time of the old gent snapping a shutter aboard the ark and you trot off to get the films you need. And so on until your chores are finished.

Now see if you can remember the rest? •



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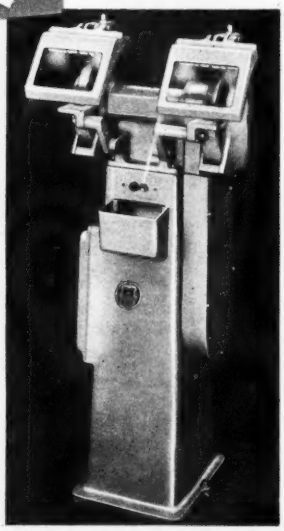

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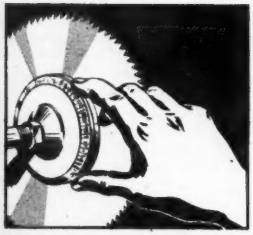

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Telescope Maker's Page

[*Continued from page* 151]

which can be loosened so that the tube can be readily rotated in the saddle in order to place the eyepiece in the most convenient position.

The tripod head is made of cast iron with three drilled joints to accept the bolts which hold the 2x6 in. tapered legs. A short section of chain is fastened to the bottom of each leg in order to limit their extension.

The polar axis is mounted in ball bearings. A 96-tooth gear is attached through a friction clutch to the axis. The worm for this gear is driven by a 60-tooth gear which is attached to a hand drive through another friction clutch. This arrangement makes it possible to slip the telescope in right ascension and also permits hand correction without disturbing the drive proper. The motor used to drive the gear trains is a one rpm Crane synchronous timing motor. All the gears used are war surplus items and yield a 4.011 to 1 reduction which corrects the drive to within approximately 30 seconds of sidereal time. •

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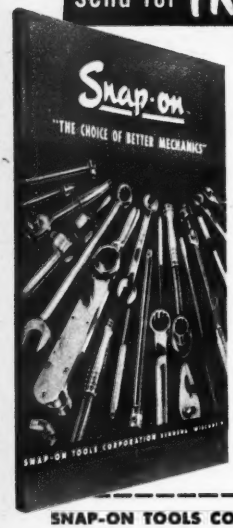

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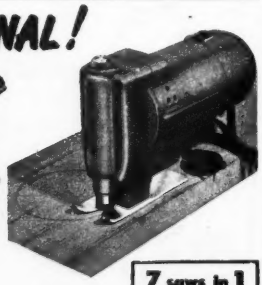

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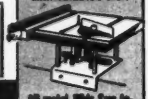

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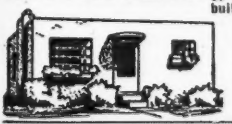

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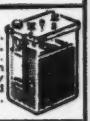

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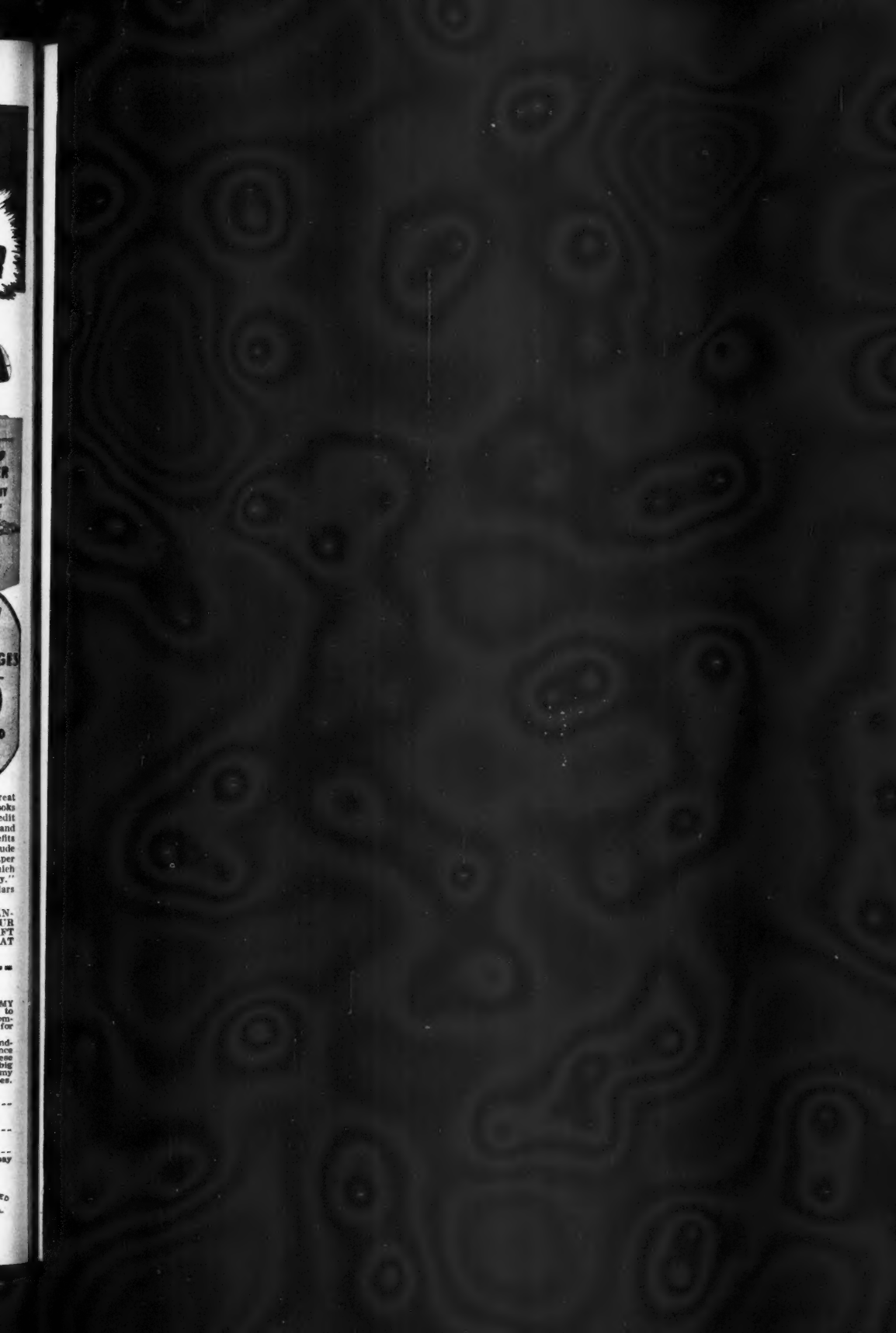

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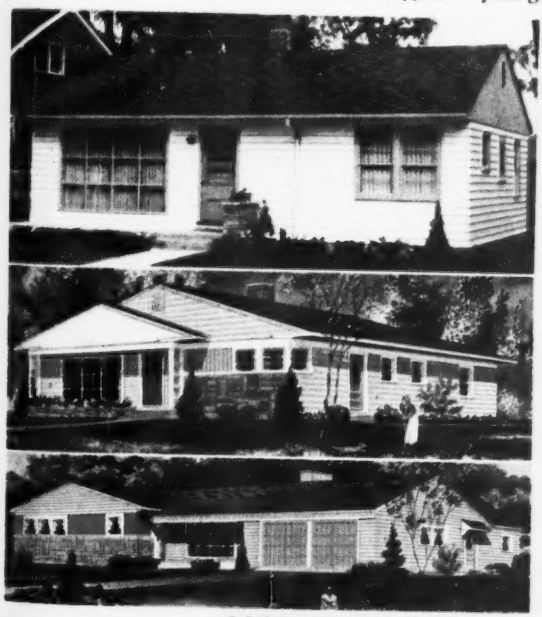

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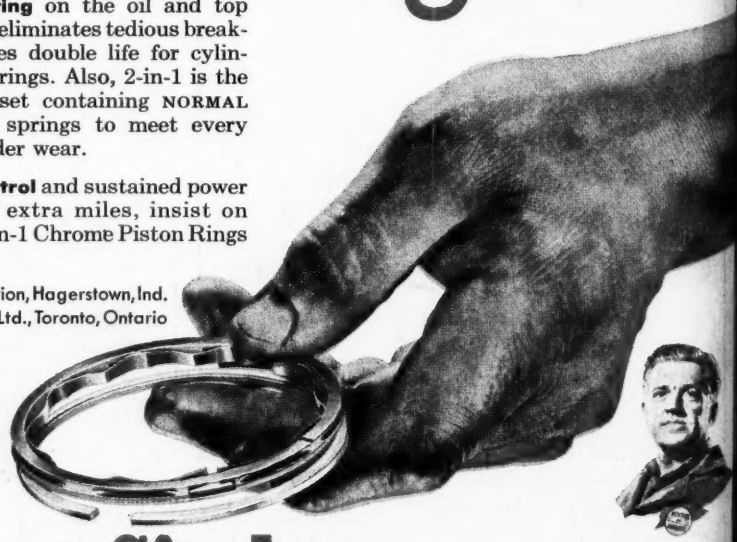

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